

A REVISION OF THE NORTH AMERICAN ANTS OF THE GENUS MYRMICA LATREILLE WITH A SYNOPSIS OF THE PALEARCTIC SPECIES. I.

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Among the best known and most interesting species of ants are those belonging to the genus *Myrmica*. Common and conspicuous insects, they have long figured in the popular literature of Europe as "red ants," or "fourmis rouges." In general habitus they may be regarded as typical ants: they are of medium size, with 12-jointed antennae (13-jointed in the male), possess a two-jointed pedicel, sharply separating the thorax and gaster, and are inconspicuously colored in various shades of blackish-, reddish- or yellowish-brown. The species are terrestrial, developing colonies of medium size, which are to be found under stones, logs or grass roots. A large part of our information on ant morphology is due to Charles Janet who, between 1892 and 1907, chose *Myrmica rubra* for many of his studies, probably because it was a typical and common ant. Wasmann and Donisthorpe have recorded 79 species of myrmecophiles occurring with ants of this genus in diverse relationships.

Students of ants dealing with a genus numerous in species and variable individuals come to think of it as being the *crux myrmecologorum*. This became my attitude while studying *Myrmica* under W. M. Wheeler in 1932-34. At that time the collection of this great master had not been divided between Harvard University and the American Museum of Natural History. In addition, the state of the world made it easy for me to acquire collections from myrmecologists in other countries and from other American institutions.¹ There had never been a general revision, so that collections generally consisted chiefly of unidentified specimens.

This great wealth of material, probably the largest collection of ants of this genus ever to have been brought together in one place, posed embarrassing problems. In a small collection from scattered localities it would have been relatively easy to have assigned the ants various names, using new names for specimens which differed more or less from previously recognized forms. In a very large collection, however, this is not so easy because the extremes tend to be connected by intermediate forms. It also seemed inescapable that several forms, called "varie-

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ties," which had long rested in the literature were not valid. Although these included several created by Wheeler in 1907 he concurred in my opinion. Fortunately nearly the entire type series was available in his forms and cotypes represented those described by others.

Little time could be devoted to these ants in the intervening years, but the frequent requests for identifications for use in other studies have added new records and necessitated publication of a short paper in 1939 to validate manuscript names. Also, early in 1939, copies of my keys to workers, females and males of the North American forms were distributed to Drs. A. C. Cole, W. S. Creighton, M. R. Smith, M. Talbot and G. C. Wheeler.

Since the North American *Myrmica* are closely related to those of Europe and Asia a study of the fauna of these regions was necessary. Unfortunately Bondroit and others created numerous forms which cannot be evaluated from the descriptions alone. Emery, Wheeler and others were highly skeptical of many. In the absence of much palaearctic type material the original plan for a world revision has been abandoned. The palaearctic synopsis will assist future workers, however, in view of the 40 years which have elapsed since there has been any attempt at treating this fauna as a whole. Forel keyed the Swiss *Myrmica*s, Ruzsky the Russian forms known in 1905, Emery the palaearctic species in 1908 and Finzi the European forms in 1926. Ern. André, Stårcke and Santschi have treated parts of the European fauna. Dr. Wheeler had understandably refrained from this task for North America and had assigned it to me as my initial taxonomic problem.

CLASSIFICATION

In the 10th edition of the *Systema Naturae* (1758), Linnaeus gave the first name, *Formica rubra*, to a member of this genus. The generic name, from the Greek "*μυρμηξ*"—ant, dates from 1810, when Latreille made the Linnaean species the type of this genus. For the remainder of the nineteenth century *Myrmica* was made a receptacle for many species with two-jointed pedicel, which are now removed to other genera.

Since the worker is the caste usually collected, it has naturally been used as the basis of our classification. For the present treatment, especially of the North American species, I have had a sufficient number of males and females associated with the workers to be able to use the three castes together in determining relationships. The genitalia of the male have proved to be of much aid and especially the volsellae, the paired hook-like appendages on each side of the medial sagittae constituting the penis.

Every North American myrmecologist has found the workers to be highly variable. To repeat my 1939 statement: "it should be emphasized that frequently no satisfactory determination can be made of specimens unless at least the male caste is present with workers from the same nest." This variability is not unique in *Myrmica*, however, for some species of *Solenopsis*, *Crematogaster*, *Attini* and *Camponotus*, to name a few, are similar.

Variability in color may sometimes be explained on the basis of temperature and humidity. An ant, such as *Myrmica brevinodis*, reared under cool and humid conditions may be darker than one of the

same species reared under warm and dry conditions. In a given locality where both *brevinodis* and *sabuleti americana* occur, the former is darker in color and likely to be found in the cooler and damper spots, the latter on the better drained, hence dryer, and sunnier places. *Sabuleti nearctica*, in its type locality and generally where taken in North Dakota, is a dark subspecies found in cool, damp, sites; *americana*, often occurring close by but in warmer and drier areas, is paler.

The revision follows the plan indicated in the 1939 paper of treating as species certain forms which some earlier authors had considered to be subspecies or varieties of *rubra* or *scabrinodis*, the two generalized species. Indeed, half of the 124 described forms known in 1934 were called subspecies or varieties of *scabrinodis*. The term "variety" was abandoned by myself years ago although it may have utility in some cases. In fact, I had used it only four times previously for new ants. Originally I had followed Dr. Wheeler in using quadrinomials in *Myrmica*. Recent practice in Europe also is to elevate certain forms, although some workers are still creating "varieties." Holgersen (1940, 1942, 1944) regards *ruginodis*, *laevinodis*, *scabrinodis*, *rugulosa*, *sulcinodis*, *lobicornis*, *schencki* and *sabuleti* as distinct species in Norway. Stårcke (1942 a and b, 1943) similarly regards these as distinct species in Europe. Donisthorpe (British Ants, 1927) has long considered those of the above forms occurring in Great Britain, except *sabuleti*, as "good though closely allied species."

The varietal status is here retained, however, for three North American ants which were so originally described and which future study may show to be three modern instances of importation from Europe, thus not deserving to be named at all. Certain doubtful or incompletely known palaearctic varietal names are also provisionally retained. A number of the forms from Europe are not described, but references are given to them. It is felt that they are the result of hair-splitting distinctions, which if consistently adopted would lead to the giving of a new name to almost every individual ant. This, obviously, does not subserve the purposes of classification.

For additional bibliography and synonymy prior to 1893, see the *Catalogus Hymenopterum* (Dalla Torre, 1893) and prior to 1922, the *Genera Insectorum* (Emery, 1922).

AFFINITIES

The genus most nearly related to *Myrmica* is *Manica* Jurine (Wheeler emend.) which has been considered a subgenus of *Myrmica*. I believe, however, that it would be better to regard it as a distinct genus, because of the following peculiarities:

The epinotum of the worker is unarmed instead of possessing distinct spines.

The teeth on the mandibles of the worker are more numerous and smaller.

The male has worker-like mandibles, whereas in *Myrmica* these organs are weaker and have fewer teeth.

The genitalia of the male can be readily distinguished from those of any *Myrmica* by the volsellae, which have a distinct lobe-like prolongation of the angle opposite the hook. The nearest approach to this

characteristic is found in *Myrmica rubra* (L.) in which, however, the prolongation is acutely angular. The genus *Manica* includes one Eurasian species, *M. rubida* (Latr.), and five American species, *aldrichi* Wheeler, *bradleyi* Wheeler, *hunteri* Wheeler, *mutica* Emery, and *parasitica* Creighton, parasitic upon *bradleyi*. The species, both in Europe and in North America, inhabit mountainous regions but are found only at moderate elevations nesting in comparatively dry and sandy situations.

Next to *Manica* the genus *Aphaenogaster* Mayr seems closest to *Myrmica* but differs clearly in the simple posterior tibial spurs, in slender habitus and in having the petiole always distinctly pedunculate. The genitalia of the male, nevertheless, show that *Aphaenogaster* is fairly close to some forms of *Myrmica scabrinodis* Nyl. and the relationship between the two genera may prove to be even closer when the males of *M. ritae* Emery and *margaritae* Emery are discovered.

FOSSIL RECORD

The fossil record of *Myrmica* is limited to one species, *M. longispinosa* Mayr., of the Baltic Amber (Oligocene), known from the holotype and one additional specimen identified by Dr. Wheeler (1914, pp. 59-60). Mayr believed it to be closely related to the recent *M. sulcinodis* Nyl. *Nothomyrmica intermedia* Wheeler, from the Baltic Amber, closely resembles *Myrmica* and was excluded from that genus only because it lacks spurs on the middle and hind tibiae. Thus far no *Myrmica* has been taken in the Florissant shales of Colorado (Miocene) or other North American deposits, although Dr. Carpenter (1930) has described several species of *Aphaenogaster* and other Myrmicinae from the former locality. As he has shown, the *Myrmica* sp. of Scudder from the Green River formation (Middle Eocene) is not a *Myrmica*, nor, indeed, a Formicid.

DISTRIBUTION

The species of *Myrmica* are holarctic, occurring in Asia from Northern Siberia to Formosa, the mountains of Burma, Persia and in the Caucasus; in Europe from Scandinavia to Greece, Italy and Spain; in North America from the Arctic Circle to the highlands of Mexico. There are two North African records in the literature. Forel cites *M. laevinodis* from Algerian gardens and Santschi (1931) lists the mountains of Tunis and the Iberian Peninsula as the range of *M. scabrinodis* var. *aloba* Forel. Dr. C. Menozzi has sent me several workers of *M. scabrinodis* subsp. *rolandi* Bond. from Asni, Morocco. These two forms of *scabrinodis* are widespread in the Iberian Peninsula, but whether they have been introduced into North Africa by human agencies or by winged fecundated females carried by winds across the Straits of Gibraltar, is not known. Apparently they have existed in North Africa for some time since both localities are many miles inland. No forms even closely related to *Myrmica* have been taken in Ethiopia, Australia or South America.

COMPARISON OF THE PALEARCTIC AND NEARCTIC SPECIES

Before proceeding to a discussion of the origin of the species of *Myrmica* of the two continents, the forms of these two major divisions

of the Holarctic Region may be compared. Unfortunately, many of the palaearctic forms are known only from such brief and inadequate descriptions that their status cannot be accurately determined. Below are listed, however, the described forms.

PALEARCTIC

Myrmica rubra
Myrmica rubra var. *khamensis*
Myrmica rubra var. *kotokui*
Myrmica rubra var. *orientalis*
Myrmica rubra var. *silvestrii*
Myrmica rubra subsp. *yoshiokai*
Myrmica rubra var. *ruginodo-laevinodis*
Myrmica laevinodis
Myrmica laevinodis var. *europaea*
Myrmica laevinodis var. *minuta*
Myrmica laevinodis var. *tenuispina*
Myrmica Smythiesi
Myrmica Smythiesi var. *bactriana*
Myrmica Smythiesi subsp. *cachmiriensis*
Myrmica Smythiesi *cachmiriensis* var. *lutescens*
Myrmica Smythiesi subsp. *carbonaria*
Myrmica Smythiesi subsp. *dshungarica*
Myrmica Smythiesi subsp. *exigua*
Myrmica Smythiesi var. *fortior*
Myrmica Smythiesi subsp. *himalayana*
Myrmica Smythiesi subsp. *hecate*
Myrmica Smythiesi var. *rupestris*
Myrmica rugosa
Myrmica rugosa subsp. *arizana*
Myrmica rugosa var. *debilior*
Myrmica rugosa var. *kirgisica*
Myrmica aimonis-sabaudiae
Myrmica dicaporiacoi
Myrmica tibetana
Myrmica tibetana subsp. *chinensis*
Myrmica tibetana var. *furva*
Myrmica commarginata
Myrmica inezae
Myrmica pachei
Myrmica kurokii
Myrmica kurokii subsp. *kelleri*
Myrmica kurokii var. *sonfica*
Myrmica kurokii subsp. *tipuna*
Myrmica kozlovi
Myrmica kozlovi subsp. *mekongi*
Myrmica kozlovi subsp. *ruzskyi*
Myrmica kozlovi subsp. *subbrevispinosa*
Myrmica bergi
Myrmica bergi var. *barchanica*
Myrmica bergi var. *divergens*
Myrmica bergi subsp. *persiana*
Myrmica bergi *kamyschiensis*
Myrmica sulcinodis
Myrmica sulcinodis var. *nigripes*
Myrmica sulcinodis var. *sulcinodo-ruginodis*
Myrmica sulcinodis var. *sulcinodo-rugulosa*
Myrmica sulcinodis var. *sulcinodo-scabrinodis*
Myrmica sulcinodis subsp. *vicaria*
Myrmica myrmecophila
Myrmica lobicornis
Myrmica lobicornis var. *alpina*
Myrmica lobicornis var. *angustifrons*

NEARCTIC

M. laevinodis var. *bruesi*
M. laevinodis var. *champlaini*
M. laevinodis var. *neolaevinodis*

M. lobicornis subsp. *fracticornis*

PALEARCTIC

Myrmica lobicornis var. *apennia*
Myrmica lobicornis var. *arduennae*
Myrmica lobicornis var. *deplanata*
Myrmica lobicornis var. *foreli*
Myrmica lobicornis var. *jessensis*
Myrmica lobicornis var. *lissahorensis*
Myrmica lobicornis var. *littoralis*
Myrmica lobicornis var. *lobulicornis*
Myrmica lobicornis var. *pyrenaea*
Myrmica puerilis
Myrmica sabuleti
Myrmica sabuleti var. *lonae*
Myrmica sabuleti var. *pilosiscapus*
Myrmica sabuleti var. *spinosior*
Myrmica schencki
Myrmica schencki var. *brunescens*
Myrmica schencki var. *burtshak-abramovitschi*
Myrmica schencki var. *kulleri*
Myrmica schencki var. *obscura*
Myrmica schencki var. *plana*
Myrmica schencki var. *starki*
Myrmica schencki var. *salina*
Myrmica rugulosa
Myrmica rugulosa var. *hellenica*
Myrmica rugulosa var. *kievensis*
Myrmica rugulosa var. *ruginodiformis*
Myrmica rugulosa var. *rugulosa-scabrinodis*
Myrmica rugulosa var. *slobodensis*
Myrmica rugulosa subsp. *limanica*
Myrmica rugulosa limanica var. *strandii*
Myrmica scabrinodis
Myrmica scabrinodis var. *scabrinodo-lobicornis*
Myrmica scabrinodis var. *kazenkoi*
Myrmica scabrinodis var. *ahngerii*
Myrmica scabrinodis var. *aloba*
Myrmica scabrinodis var. *angulinodis*
Myrmica scabrinodis subsp. *eidmanni*
Myrmica scabrinodis subsp. *granulinodis*
Myrmica scabrinodis subsp. *lacustris*
Myrmica scabrinodis subsp. *rolandi*
Myrmica scabrinodis rolandi var. *reticulata*
Myrmica scabrinodis subsp. *rugulosoides*
Myrmica scabrinodis rugulosoides var. *striata*
Myrmica scabrinodis var. *sancta*
Myrmica scabrinodis subsp. *saposhnikovii*
Myrmica scabrinodis saposhnikovii var. *baikalensis*
Myrmica scabrinodis subsp. *stangeana*
Myrmica scabrinodis var. *turcica*
Myrmica scabrinodis subsp. *ussuriensis*
Myrmica scabrinodis var. *vandeli*
Myrmica scabrinodis subsp. *wesmaeli*
Myrmica forcipata
Myrmica ravaninii
Myrmica moravica
Myrmica myrmecoxena
Myrmica margaritae
Myrmica margaritae var. *pulchella*
Myrmica ritae
Myrmica ritae subsp. *formosae*
Myrmica ritae subsp. *indica*
Myrmica ritae subsp. *serica*

NEARCTIC

M. sabuleti subsp. *americana*
M. sabuleti subsp. *hamulata*
M. sabuleti subsp. *nearctica*
M. schencki subsp. *emeryana*
M. schencki subsp. *spatulata*
M. schencki subsp. *tahoensis*

M. brevinodis
M. brevinodis subsp.
sulcinodoides
M. brevinodis subsp. *kuschei*
M. brevinodis subsp.
brevispinosa
M. brevinodis subsp.
discontinua
M. scabrinodis subsp. *mexicana*

M. wheeleri
M. punctiventris
M. punctiventris subsp.
pinglorum

Of the 137 described forms, only 19, or 14 per cent, are nearctic. These figures show a striking preponderance of palaearctic forms. Many of the European names, however, have been coined for small variations in the workers which I have considered, in the North American collection, to be normal variants of a single form.

A more accurate analysis of the forms of the two regions may be made from the two following lists. The first includes only those forms which are closely allied in all three castes or clearly related where only the worker caste is known:

PALEARCTIC

M. laevinodis

M. lobicornis
forms

M. scabrinodis

M. sabuleti

M. schencki

NEARCTIC

M. laevinodis varieties

bruesi

champlaini

neolaevinodis

M. lobicornis subsp.

fratricornis

M. scabrinodis subsp. *mexicana*

M. sabuleti subsp.

americana

hamulata

nearctica

spatulata

M. schencki subsp. *emeryana*

The second list,[†] which follows below, includes those species which are distinctly different. I must omit species from this list which were described inadequately, or of which I have not seen specimens. I am also omitting the two supposedly parasitic species.

PALEARCTIC

M. kurokii

M. margaritae

M. moravica

M. pachei

M. rilae

M. rugosa

M. smythiesi

M. sulcinodis

NEARCTIC

M. punctiventris

M. wheeleri

From the two selected lists presented above it will be seen that, of the fifteen distinctly different species, only five are common to the entire Holarctic Region. One of these, *M. laevinodis*, is included because it has three varieties, *bruesi*, *champlaini*, and *neolaevinodis*, described from the northeastern coast of North America. They may be importations. Another is included (*M. scabrinodis*) because of a subspecies in Mexico (*mexicana*).

Of the remaining ten species, two are peculiar to the Nearctic Region. It is a mere coincidence that this fraction corresponds somewhat with the 14 per cent arrived at by taking all of the described forms at their face value.

The remaining eight species are peculiar to the Palaearctic Region. One is restricted to southeastern Europe (*M. moravica*); another, *M. sulcinodis*, is widely distributed in Eurasia; the remaining six are peculiarly Asiatic. Of these latter species three, *margaritae*, *rilae*, and *kurokii* are restricted to eastern Asia.

ORIGIN OF THE SPECIES OF MYRMICA

To summarize, then, we may say that of the several distinct species of *Myrmica*, the three most widely distributed and variable species, omitting *laevinodis* and *scabrinodis*, are truly holarctic; two are more or less widely distributed; two species are nearctic; one is of southeastern European provenience, while the remaining six are peculiarly Asiatic.

The single fossil record from the Baltic Amber proves that the genus was established by the Oligocene. It seems probable that the genus was holarctic during the Early Tertiary for conditions were mild and communication between the Palearctic and Nearctic Regions is undoubted.

Such a holarctic distribution during preglacial times would explain the present distribution of the species. The most specialized species, which are now found in eastern Asia, may have had a wider distribution but became limited to the southern and eastern part of their range during the Pleistocene. The two nearctic species, one now found on the Atlantic Coast, the other in the mountains of Arizona, could have been survivors of the glaciation, the former in the southern part of its range, the Southern Appalachians, the latter about where it now is, since that region has probably not undergone extensive glaciation. The widespread extension of the many forms of *M. scabrinodis* could have taken place after the Pleistocene. In the Palearctic Region they could have spread from eastern Asia, in the Nearctic Region from a haven in the southern Rocky Mountains. The great variability of such species as *M. rubra* and *scabrinodis* may be due to such a comparatively recent restocking of the major part of the Holarctic Region. Perhaps this influx of ants following the recession of the glaciers and reaching into new and varied environments has led to modifications of structure. For such an ancient and conservative group of animals as the ants, the time since the Pleistocene may not have sufficed for the stabilization of certain structural modifications. This would account for our finding so many puzzling series of intermediate forms at the present time.

KEY TO THE NORTH AMERICAN SPECIES AND SUBSPECIES
OF MYRMICA WORKERS

1. Gaster punctate..... 2
Gaster smooth..... 3
2. Length 4-4.7 mm.; epinotal spines about $1\frac{1}{2}$ times the distance between their bases and deflected apically..... **punctiventris**
Length 3.5-3.9 mm.; epinotal spines only slightly longer than the distance between their bases, not deflected apically..... **punctiventris** subsp. **pinetorum**
3. Antennal scape bent angularly at the base, the bend equipped with a tooth or lamina..... 4
Antennal scape evenly bent, not equipped with a tooth or lamina..... 11
4. Antennal scape with a lamina completely around the bend and prolonged along the posterior side to an appreciable extent..... 5
Antennal scape different..... 7
5. Posterior extension of the lamina projected backwards near the base in an acute tooth or hook..... **sabuleti** subsp. **hamulata**
Lamina otherwise..... 6
6. Bend of the scape with a high, suberect lamina at the base; ventral margin of postpetiole nearly flat (Fig. 1)..... **sabuleti** subsp. **americana**
Bend of the scape with a low, thickened ridge at the base, posteriorly prolonged along the side in a horizontal and much wider extension,
sabuleti subsp. **nearctica**

7. The bend with a high, thin lamina produced along the anterior side and downward, where deflected posteriorly to the base of the scape (Fig. 2),
schencki subsp. *emeryana* 8
Bend of the antennal scape otherwise. 8
8. Bend, from above, with a broad, spatulate extension of the lamina medially and slightly upwards. *schencki* subsp. *spatulata*
Bend of antennal scape otherwise. 9
9. Antennal scape at the bend laterally compressed, i.e., laterally in the same sense as when used regarding the head, with a small transverse ridge across the bend. *scabrinodis* subsp. *mexicana*
Antennal scape dorso-ventrally compressed at the bend and with a small tooth or lamina. 10
10. Length 4-6 mm.; epinotal spines projected backwards at about 30° (Fig. 3). *lobicornis* subsp. *fracticornis*
Length 3.3-4 mm.; epinotal spines projected backwards at 40°-55°; thorax much paler than head and gaster. *schencki* subsp. *tahoënsis*
11. Epinotal spines much shorter than the declivity ventral to them. 12
Epinotal spines nearly as long to longer than the declivity ventral to them, or body strongly shining. 14
12. Antennal scape ventral and median to the bend with a distinct keel on the postero-medial margin; body very finely sculptured,
brevinodis subsp. *discontinua*
Bend of scape with a faint indication of a posteromedial keel or tooth. 13
13. Epinotal spines deflected apically. *wheeleri*
Epinotal spines not deflected apically. *brevinodis* subsp. *brevispinosa*
14. Body strongly shining, sculpturing largely smooth. 16
Body largely dulled by sharp and deep sculpturing. 15
15. Head and gaster dark brown to black, thorax and appendages red-brown,
brevinodis subsp. *sulcinodoides*
Color lighter. *brevinodis* and its subsp. *kuschei* of Alaska
16. Medial funicular joints quite as broad as long. 17
Medial funicular joints longer than broad. *laevinodis* var. *bruesi*
17. Epinotal spines as broad at the base as long. *laevinodis* var. *champlaini*
Epinotal spines longer. *laevinodis* var. *neolaevinodis*

KEY TO THE NORTH AMERICAN SPECIES AND SUBSPECIES
OF MYRMICA FEMALES

1. Gaster punctate. 2
Gaster smooth. 3
2. Length 5-5.7 mm.; epinotal spines long and curved slightly downwards,
punctiventris
Length 4.7-5 mm.; epinotal spines short and straight,
punctiventris subsp. *pinetorum*
3. Antennal scape bent angularly at the base and equipped with a dorsal tooth or lamina. 4
Antennal scape evenly bent, not equipped with a dorsal tooth or lamina. 11
4. Antennal scape with a lamina completely around the bend and prolonged along the posterior side to an appreciable extent. 5
Antennal scape different. 7
5. Posterior extension of the lamina projected backwards near the base in an acute tooth or hook. *sabuleti* subsp. *hamulata*
Lamina otherwise. 6
6. Bend of the scape with a high, suberect lamina at the base,
sabuleti subsp. *americana*
Bend of the scape with a low, thickened ridge at the base, posteriorly prolonged along the side in a horizontal and much wider extension,
sabuleti subsp. *nearctica*
7. The bend with a high, thin lamina produced along the anterior side and downward, where deflected posteriorly to the base of the scape,
schencki subsp. *emeryana*
Bend of the antennal scape otherwise. 8
8. Bend, from above, with a broad spatulate extension of the lamina medially and slightly upwards. *schencki* subsp. *spatulata*
Bend of antennal scape otherwise. 9

9. Antennal scape at the bend laterally compressed, i.e., laterally in the same sense as when used regarding the head, with a small transverse ridge across the bend. *scabrinodis* subsp. *mexicana*
Antennal scape dorso-ventrally compressed at the bend and with a small lamina. 10
10. Antennal scape with a lamina; length 4.7-6.4 mm.; pronotum coarsely reticulate anteriorly. *lobicornis* subsp. *fracticornis*
Not so. 11
11. Antennal scape with a lamina; length 4.5-5 mm.; pronotum transversely rugose. *schencki* subsp. *tahoënsis*
Not so. 12
12. Length 4.5-5.2 mm.; thorax with moderately abundant, fine and acute hairs. *wheeleri*
Size larger. 13
13. Antennal scape distinctly compressed at the base and with a slight dorso-medial keel; length 5.3-6.3 mm.; color largely brownish red, *brevinodis* subsp. *brevispinosa*
Not so. 14
14. Length about 5.6 mm.; color of body dark brown, appendages yellow brown; scutum of mesonotum with coarse, shallow pits at the base of the sculpturing. *brevinodis* subsp. *kuschei*
Not so. 15
15. Color of body blackish brown, appendages brown; length 6.3-7.2 mm., *brevinodis* subsp. *sulcinodoides*
Not so. 16
16. Antennal scapes stout; antero-medial and parapsidal dark brown blotches on the mesonotum, pronotum lighter. *brevinodis*
Antennal scapes slender; pronotum dark brown, scutum of mesonotum much paler and with a posteromedian darker blotch. *laevinodis* var. *bruesi*
The females of *brevinodis* subsp. *discontinua* and *laevinodis* varieties *neolaevinodis* and *champlaini* are unknown.

KEY TO THE NORTH AMERICAN SPECIES AND SUBSPECIES OF MYRMICA MALES

The genitalia, particularly the volsellae, offer more reliable characters for separating the species and subspecies, but cannot easily be put in a Key.

The "Antennal scape length" is given as the number of succeeding joints which, together, are as long as the scape.

1. Gaster punctate. 2
Gaster smooth. 3
2. Antennal scape length 6. *punctiventris*
Antennal scape length 2. *punctiventris* subsp. *pinetorum*
3. Antennal scape length 2. 4
Antennal scape length 3-7. 6
4. Antennal scapes distinctly incrassate medially; scape length 2-3, *sabuleti* subsp. *hamulata*
Antennal scapes subcylindrical. 5
5. Size 5-6.3 mm. *brevinodis*
Size 6.3-7.2 mm. *brevinodis* subsp. *sulcinodoides*
6. Antennal scape length 3. 7
Antennal scape length 4-7. 11
7. Volsellae of genitalia without median tooth. *wheeleri*
Volsellae of genitalia toothed. 8
8. Size 3.5-4 mm. *schencki* subsp. *tahoënsis*
Size 4.6-5.6 mm. 9
9. Antennal scape length 3-4; scapes slightly bent medially, *brevinodis* subsp. *brevispinosa*
Antennal scape length 3 or less; scapes slightly bent at the base. 10
10. Antennal scape length slightly less than 3; about $2\frac{1}{2}$ times as long as broad; color brown. *sabuleti* subsp. *nearctica*
Antennal scape length 3; about 3 times as long as broad; color dark brown, *schencki* subsp. *emeryana*

11. Antennal scape length 6-7; scutum of mesonotum completely sculptured, partly obscuring Mayrian furrow.....*scabrinodis* subsp. *mexicana*
Antennal scape length 4-6; scutum of mesonotum largely smooth and shining, Mayrian furrow distinct.....12
12. Antennal scape length 4-5, typically 4; scape $\frac{1}{4}$, or less, as broad as long.....*sabuleti* subsp. *americana*
Antennal scapes longer and more slender.....13
13. Antennal scape length 5-6, typically 6; scape one-fifth or more, as broad as long.....*lobicornis* subsp. *fracticornis*
Antennal scape length 6; scape one-seventh as broad medially as long,
laevinodis var. *bruesi*

The males of *schencki* subsp. *spatulata*, *brevinodis* subsp. *discontinua* and *kuschei* and of *M. laevinodis* varieties *neolaevinodis* and *champlainis* are unknown.

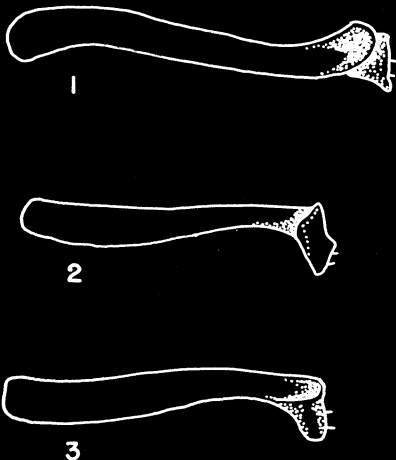


FIG. 1. Antennal scape of *Myrmica sabuleti americana* Weber, worker.

FIG. 2. Antennal scape of *Myrmica schencki emeryana* Forel, worker.

FIG. 3. Antennal scape of *Myrmica lobicornis fracticornis* Emery, worker.

THE HOLARCTIC SPECIES OF MYRMICA LATREILLE

Myrmica rubra (L.) Latreille

Myrmica rubra was described in the 10th edition of the *Systema Naturae* (1758, p. 983) as *Formica rubra*:

"F. testacea, oculis punctoque sub abdomine nigris."

In the 12th edition (1767) he adds:

"Habitat in Europa tuberibus graminosis; pessime nostratum pungit."

Latreille, in 1810, (Cons. Gen. Crust. Ins. 312 No. 445, 437) made *Formica rubra* the type of genus *Myrmica* and this genotype has been accepted by later myrmecologists.

In 1846 Nylander split *Myrmica rubra* into the species *laevinodis*, *ruginodis*, *sulcinodis* and *scabrinodis* but, unfortunately, did not retain the specific name of *rubra* for any ant. Emery pointed out, in 1908, that *Myrmica rubra* could only be applied to *laevinodis* and *ruginodis*, for they were the only species of *Myrmica* that could sting at all badly. He therefore made *laevinodis* and *ruginodis* subspecies of *rubra* but neglected to synonymize one of them with the typical *rubra*. The genotype, of course, must be represented by a concrete form.

The description "testacea, oculis punctoque sub abdomine nigris" fits *ruginodis* better than it does the paler *laevinodis*. Santschi (1931, p. 339) has also pointed out that, since *laevinodis* was the first species to be taken out of *rubra*, the remaining species, *ruginodis* of Nylander, becomes a synonym. I am here following Santschi in synonymizing *ruginodis*.

Myrmica subsp. *rubra* (L.)

M. ruginodis, Nylander, Act. Soc. Sc. Fennicae, 1846, 2: 929-930, pl. 18, figs. 5, 30,

♀ ♂; Finzi, Boll. Soc. Adr. Sc. Nat., Trieste, 1926, 29: 85-86, fig. 2.

M. rubra ruginodis of authors in Genera Insectorum (Emery, 1922).

M. rubra (L.), Santschi, Rev. Suisse Zool., 1931, 38: 330.

M. dimidiata, Say, Boston Jour. Nat. Hist. 1836, 1: 293.²

Worker (after Nylander): Length 2 lin. Similar to the preceding (*M. laevinodis*), but a little larger, very coarsely rugose, metanotum longitudinally rugose in front of the spines, spines long and the pedicel with irregular longitudinal, but not profound, rugosities. Clypeus above rather smooth. Otherwise as in the preceding.

Female (after Nylander): Length almost 2½ lin.

Similar to the preceding female, but colored as follows and meta-thoracic spines distinctly double the length: Dorsal surface of head fuscous, clypeus darker eyes black; between the eyes, the mandibles and antennae, testaceo-ferruginous; mandibles at the apex a little fuscous. Clypeus rather more confusedly striate than in the preceding. Metanotum and sides of thorax faintly, scutellum very distinctly,

²*Myrmica dimidiata* Say from the United States was described as "body pale yellowish; thorax somewhat tinged with piceous" . . . "length over one-fifth of an inch;" the omitted part of the description deals with the wings and is a purely generic diagnosis. The color of the body is that of no nearctic *Myrmica* female although the size might be that of any of the forms of Eastern America. It is unsatisfactorily synonymized with the type species of the genus since the actual specimen appears to be lost and it is impossible otherwise to correlate it with known forms.

fuscous; spines very long. Wings as in the preceding. Legs entirely a pallid testaceo-ferruginous. Pedicel as in the worker.

Male (after Nylander): Length $2\frac{1}{2}$ lin.

Very similar to the male of the preceding species, but a little larger, head in the first place conspicuously larger, stigma of the wings distinctly fuscous, legs long and bare. Head shining, finely and faintly rugulose; clypeus smooth and evenly convex. Wings as in the female; legs lightly pubescent, almost bare.

Figure 5 of Nylander's description is of the wing of a female. Figure 30 is of the epinotum and petiole in profile; the spines are drawn slightly deflected downward and only slightly shorter than the declivity ventral to them; the metasternal teeth are acute and directed upwards; the petiole, from apex of mid-ventral tooth to posterior margin, is distinctly longer than high and with concave anterior face and subcylindrical peduncle.

For a complete discussion of this subspecies, see Donisthorpe (1915, pp. 115-121). It is widely distributed in Europe and in western Asia.

Myrmica rubra var. *khamensis* Ruzsky

M. ruginodis Nyl. var. *khamensis*, Ruzsky, Ann. Mus. Zool. Acad. Imp. Sc., 1915, 20: 441, figs. 22-24, v.

Worker (after Ruzsky):

Differing from the typical form by the smooth and shining infra-spinal surface of the epinotum, the basal surface also being flatter. The epinotal spines are shorter, the sculpturing of the body weaker and the color darker.

Type Locality: Tibet: Yangste basin, 11,400 feet, Aug. 1900, Sept. 1901 (Kozlov).

According to Ruzsky's figures the epinotal spines are distinctly shorter than the declivity ventral to them and have the apices directed upwards. The length of the petiole from apex of ventral tooth to postpetiole is a little shorter than the height at the node. The antennal scape distinctly exceeds the occipital margin and is relatively incrassate distally.

Myrmica rubra var. *kotokui* Forel

M. rubra subsp. *kotokui*, Forel, Sitz. der Bayerisch. Akad. Wiss., 1911: 267-268, ♀, ♂.

Worker (after Forel): Length 3.7-4.3 mm.

Related to *laevinodis* and *kurokii*, but much smaller than the latter and with weaker sculpturing. Head even longer than in *rugulosa*, much longer than wide, posteriorly somewhat narrower than in the middle. Antennae as in *laevinodis*, etc.; the bend of the scape some wider. Epinotal spines precisely as in *rubra*, much longer than in *laevinodis*. Petiole thicker than in *laevinodis*, somewhat as in *rubra*. Sculpturing of the head even weaker than in *laevinodis*, but the clypeus is quite wrinkled. Sculpturing of the thorax as in *rubra* (stronger than in *laevinodis*), but the epinotum between the spines is smooth. Color as in *rubra*, or somewhat darker and at the same time the reddish color somewhat paler.

Female (after Forel): Length 5.5 mm.

Head as in the worker, posteriorly clearly narrower than in the middle. Thorax narrower than the head. Epinotum smooth between the spines. Brown; joints, mandibles, antennae and legs yellowish to brownish yellow. Otherwise as in *rubra*.

Male (after Forel): Length over 6 mm.

Head somewhat longer than broad, posteriorly not broader than anteriorly (in *rubra* broader than long, posteriorly broader than anteriorly). Almost black; gaster posteriorly brownish, with lighter sutures; legs reddish; antennal scape and femora brown. Otherwise as in *rubra*.

Type Locality: Northern Japan (Dr. Haberer).

"Perhaps only a variety of *rubra*, but differs in the shape of the head and the smooth surface between the epinotal spines."

The single worker mentioned by Dr. Wheeler (1928) from Nikko (Hondo) (2,000–3,000 feet) seems referable to this form. As Dr. Wheeler states "the petiole and post-petiole are finely punctate and on the sides coarsely rugose, but the upper surface is smoother and on the postpetiole with a few short sulci."

Myrmica rubra var. *orientalis* Karawajew

M. ruginodis subsp. *orientalis*, Karawajew, Mem. Acad. Sc. Ukraine, 1926, 4: 47, fig. 1, ♀; Kuznetsov-Ugamskij, "The Ants of the South Ussuri Region (In Russian)," 1928: 37–39, figs. 22–26, ♀ ♀ ♂; Kuznetsov-Ugamskij, Zool. Anz., 1929, 83: 33, ♀ ♀ ♂.

Worker (after Karawajew and Kuznetsov-Ugamskij): Length 4–4.5 mm.

Head broadest anteriorly, anterior margin of the clypeus somewhat more angular than in the typical form, frontal carinae somewhat more diverging posteriorly; the antennal scape clearly surpasses the occipital margin (by a distance equal to more than its distal diameter, according to the figure). Epinotal spines longer than in the typical *M. laevinodis*, metasternal spines different, pointed or blunt. Petiole angular in profile.

Sculpture as in the typical *rubra* except for the somewhat diverging longitudinal sculpturing on the head; infraspinal surface of epinotum smooth and strongly shining; dorsal surface of pedicel finely sculptured, dully shining.

Color dark brown, legs, antennae and apex of gaster somewhat lighter.

Female (after Kuznetsov-Ugamskij). Length 5.7–6.2 mm.

Blackish brown. Mandibles yellowish brown. Sides of the head, thoracic sutures, pedicel, ventrally, and apex of gaster reddish brown.

Male (after Kuznetsov-Ugamskij). Length 4.3–5.6 mm.

Black or blackish brown. Antennae, mandibles and legs lighter or quite clearly brownish. Antennal scape equal in length to the 4 following segments together (according to Kuznetsov-Ugamskij's figure).

Type Locality: 30 km. north of Vladivostok. (W. Fedynsky). Siberia: Shore of Kosminschen Bay, Pestshanyi, Gulf of Amur, Okanskaja, Tigrovaja, Bassargin, Sichoto-alin-Pasz between Kangarez and Ssutschan (Kuznetsov-Ugamskij).

Myrmica rubra var. *silvestrii* Wheeler

Myrmica ruginodis var. *silvestrii*, Wheeler, Boll. Lab. Zool. R. Ist. Portici, 1928, 21: 100-101, ♀.

Worker (Original description). Length 4.5-5.5 mm.

"Of the same size as *ruginodis* (*rubra*), but differing in the following characters: Head larger and broader; antennal scapes a little more slender at the base, epinotal spines straight and distinctly shorter, petiolar peduncle shorter and the node more sharply truncated above. Sculpture coarser, the rugae on the pronotum being thicker, more rounded and very irregular and vermiculate, the declivity of the epinotum smooth and shining. Petiole and postpetiole much more strongly longitudinally rugose, the latter subopaque. Color much darker; deep piceous brown; posterior portion of head, petiole, postpetiole and most of gaster nearly black; epinotal spines and legs brownish yellow; mandibles, antennae, ventral portion of petiole and tip of gaster somewhat darker and more reddish."

"Fifteen workers from Chuzenji Lake, near Nikko (Hondo) (type-locality), Japan, and one somewhat smaller specimen from Nikko."

"This variety is quite distinct from *kotokui* in its larger size, darker color, relatively shorter epinotal spines and more coarsely sculptured petiole and postpetiole."

Myrmica rubra subsp. *yoshiokai*, subsp. nov.

Worker: Length 4.5-5.3 mm.

Head, between the eyes, about 0.6 as broad as long (with mandibles); occipital corners evenly rounded, occipital margin straight; antennal scape slightly exceeding the occipital margin, obtusely and evenly bent at the base as in the typical *rubra*; joints 1 and 2 of the funiculus together as long as joints 3-5 together; antennal club 4-jointed. Thorax, in profile, deeply and angularly impressed at the mesoepinotal suture; epinotal spines in profile, slender, acute, projected backwards and upwards at about 45 degrees, slightly shorter than the declivity ventral to them; from above, widely diverging, about $1\frac{1}{2}$ times as long as the distance between their bases. Petiole, in profile, slightly shorter from apex of ventral tooth to postpetiole than it is high; anterior surface weakly concave, dorsal surface weakly convex; the two meet at a slightly rounded right angle. Postpetiole, in profile, with posteriorly produced convex dorsal surface, ventral surface produced in a slight concavity anteriorly. Gaster ovate. Legs moderately long and slender.

Surface of body shining. Dorsal surface of head finely and quite regularly rugulose, sides reticulate-rugulose, base of sculpturing feebly punctate; frontal area smooth but for several median striae; clypeus with a variable number of low rugae which fade out posteriorly, sparsely punctulate interrugally; general sculpturing somewhat stronger than in the typical *rubra*. Thorax and pedicel sculptured as in the typical *rubra*; declivous surface of epinotum smooth but for faint transverse striae between the spines which grow coarser towards the dorsal margin.

Pilosity as in the typical form.

Color of the body dark brown, appendages yellow brown, slightly darker than some Japanese specimens of the typical *rubra* and much darker than the majority of European specimens.

Described from three workers from Gummaken, Japan, 14. VII.30 (H. Yoshioka coll.) in Dr. Wheeler's collection.

This subspecies is distinguished from the typical *rubra* chiefly by the shorter antennal scape and petiole and by the deeper mesoepinotal notch. It is distinctly larger than the variety *kotokui* Forel and has the epinotum between the spines faintly striate. From *kurokii* Forel it is distinct in the absence of the medial occipital convexity, differently formed pedicel, less coarse sculpturing and in other ways. From *rubra* var. *silvestri* Wheeler it differs in distinctly narrower head, differently formed pedicel, much finer and more longitudinal sculpturing and in other ways.

***Myrmica rubra* var. *ruginodo-laevinodis* Forel**

M. rubra race *ruginodo-laevinodis*, Forel, Den. Schw. Ges. NW., 1874, 26: 77-79, 8 ♀.

A name for the transitions between *rubra* (*ruginodis*) and *laevinodis*. Donisthorpe (1927, p. 123) gives the bibliography and discusses this form.

***Myrmica laevinodis* Nylander**

M. laevinodis, Nylander, Act. Soc. Sc. Fennicae, 1846, 2: 927-928, pl. 18, figs. 4, 31, 8 ♀ ♂.

Worker (after Nylander): Length $1\frac{3}{4}$ -2 lin.

Very shining, dirty testaceous, eyes small, prominently rounded and black. No ocelli. Vertex and front of head a little darkened, entirely longitudinally subreticulate-striatulate, but less regularly laterally; striae from the margins to the occiput darkened; clypeus above and the frontal area smooth; mandibles about 8-dentate, apically smooth; margins of the frontal laminae suberect, a little reflexly arcuate. Antennal scapes bent basally in a small arc. Thorax narrower than the head, compressed between the meso- and metathorax, dorsally depressed; metanotum transversely rugulose in front of the spines. Pedicel almost smooth, shining, sparsely pilose. Gaster longer than the head, ovate, seen from above, a little broader than when seen from the side; dorsally sometimes less infuscated, nearly entirely fuscous; gaster marked either with little spots or large fuscous blotches, sometimes obsolete.

Female (after Nylander): Length $2\frac{1}{2}$ lin.

Similar to the worker but larger, darker and more rugose. Ocelli distinct. Head fuscous, mandibles testaceous, at the apex slightly smooth, fuscous; antennae testaceous, at the apex fuscous. Mesothorax testaceo-ferruginous, otherwise ferrugineo-fuscous, epinotal spines much shortened, subdentiform. Legs entirely a sordid, pale testaceous, pubescent. Pedicel obsoletely rugulose. Gaster nearly longer and a little broader than the thorax, rather more rotund than in the worker, dorsally and medially fuscous. (Wings absent in our specimens).

Male (after Nylander): Length 2 lin.

Fuscous black, shining, head a little opaque. Head faintly and thinly striatulate to rugulose, small. Palpi and mandibles testaceous, about 7-denticulate, rufous at their apices. Antennae fuscous, funiculi

at least sordid rufous; scapes almost exceeding one-third of the funiculi, about as long as the 7 following joints; antennae 13-segmented. Eyes very prominent; ocelli distinct. Thorax very shining; almost all the sutures crenate; metathorax with subangular tubercles on both sides. Wings chiefly hyaline, from the stigma to the base a faint, pale cinereous, veins and stigma dilute, pale cinereous; . . . (wing venation), wings about $2\frac{1}{4}$ lin. long. Pedicel and gaster shining. Margins of the leg segments and the entire tarsi pale testaceous, tibiae sometimes pale fuscous; long, slender pilosity.

Figure 4 of Nylander's description is of the wing of a male in which the radial vein traverses the entire length of the first cubital cell, forming a second cubital of about half the size. Figure 31 is of the epinotum and petiole in profile; the spines are about half as long as the declivity ventral to them; the petiolar peduncle is subcylindrical and the node rises smoothly but at right angles, the node being about $\frac{3}{4}$ as high as the petiole is long between the apex of the ventral tooth and the posterior margin.

For a complete discussion of this subspecies see Donisthorpe (1915, pp. 110-114). It is widely distributed over Europe and Asia.

***Myrmica laevinodis* var. *bruesi* Wheeler**

M. rubra laevinodis var. *bruesi*, Wheeler, Psyche, 1906, 13: 38.

Original Description: "A number of workers, females and males taken by Mr. C. T. Brues and myself during 1900 and 1902 from a few large colonies nesting under stones at the edge of Fay's Woods, Woods Hole, Mass., agree very closely with European specimens of *M. laevinodis* from Russia, Austria, Germany, England and Scotland in my collection. The thorax of the workers of the American form is smoother, more shining and less regularly sculptured than in the European specimens, but I am unable to find any other differences of importance and therefore establish this variety with some hesitation. I should be inclined to regard it as directly imported from Europe were it not that Forel has described two subspecies of *M. rubra* (*M. neolaevinodis* and *M. champlaini*) from New York and Canada respectively, both allied to the European *laevinodis* but with distinctive characters. The former has short antennae, with the tips of the scapes extending only a short distance beyond the posterior corners of the head, the latter has very short epinotal spines. It thus appears that America possesses indigenous forms closely related to *laevinodis*, just as it has long been known to possess numerous varieties of the other boreal and subboreal subspecies of *M. rubra*."

The above account and description gives the status of this ant at the present time. I find among the collections distinct polymorphism in the workers. Many workers are indistinguishable, furthermore, from typical *M. rubra rubra* and have the epinotal spines clearly longer than the distance between their bases, have the infraspinal surface transversely striate and are dark reddish-brown in color. Males taken with them have more abundant and more erect hairs on the tibiae than are found in *r. rubra*.

In 1908 (Journal Econ. Ent., 1: 337-339) Dr. Wheeler recorded this ant from the Forest Hills and Jamaica Plain region about Boston. In

1933-34 I found it very common locally in the Boston vicinity and took it also at Woods Hole. Generally it was taken in rather damp situations. One colony consisted of 1094 workers and several queens; another had eight queens. In 1940 I found it at Nahant, north of Boston on the Bay, and in 1946 again at Woods Hole. Dr. A. H. Sturtevant has had a long acquaintance with the species at Woods Hole and agrees with me in doubting its validity. Dr. Wheeler, of course, was fully aware of its provisional status. It is curious that in the approximately half century in which it should be known in Massachusetts it has not spread farther. Indeed in 1946 it was still to be found exactly where it was in 1900—at the edge of Fay's Woods (or Gardens), Woods Hole. Stray workers were taken on top of the stone wall and in the woods nearby, across from the schoolhouse on School Street. *Myrmica schencki emeryana*, a native ant, was seen here also but the nearest worker found in a casual search on one day was about 50 feet away from *laevinodis*. It would be interesting to determine what factors, including competition from native *Myrmica*s and other ants, prevent the extension of the range of *laevinodis*.

Myrmica laevinodis var. *champlaini* Forel

M. rubra laevinodis var. *champlaini*, Forel, Mitt. Naturh. Mus. Hamburg, 1901, 18: 80-81, ♀.

Worker (after Forel):

Very similar to the foregoing (*M. neolaevinodis*), the metanotum, however, has only two strongly triangular teeth, or, if one prefers, two very short spines, which are not longer than they are broad at their bases. The sculpturing on the head and thorax is denser and stronger, almost as in *ruginodis*. The declivity of the metanotum, however, is entirely smooth and shining, and the pedicel has, only on the sides a few longitudinal impressions. Reddish with brownish head and gaster. Petiole very short, its posterior surface, from the apex, is as long as the anterior declivity, the latter somewhat concave. Antennal scape as in *neolaevinodis*, or even somewhat shorter; the scape does not exceed the occipital margin.

"Quebec, Canada. On the border of a meadow path, near the harbor, collected by myself.

"Both these forms are closely related to *laevinodis*, but with American peculiarities. While in *neolaevinodis* the spines are at least as strong as in *laevinodis*, they are extraordinarily stunted in *champlaini*."

Myrmica laevinodis var. *europaea* Forel

M. rubra subsp. *champlainii* var. *europaea*, Forel, Rev. Suisse Zool., 1911, 19: 457, ♀.
M. laevinodis var. *europaea*, Finzi, Boll. Soc. Adriatica Sc. Nat. Trieste, 1926, 29: 84, ♀.

Worker (after Forel):

Spines dentiform as in the type of the subsp. (*champlainii*). Peduncle of the petiole more distinct but shorter than in *laevinodis*. Color of a pale *laevinodis*. Sculpture of *laevinodis*.

Type Locality: Norway: Bredheim, Nordfjord (Prell).

Myrmica laevinodis var. *minuta* Ruzsky

M. laevinodis var. *minuta*, Ruzsky, Formic. Imp. Rossici, 1905: 670, ♀.

Worker (after Ruzsky): Length 3.5–3.8 mm.

Differing from the typical *laevinodis* in its small stature and the form of the petiolar node, which, dorsally, is broader and flatter; this and the postpetiole are somewhat dull and more sharply sculptured. Eyes somewhat larger and more convex. Segments 2–5 of the antennal funiculi are quite as broad as long. Epinotal spines as in the typical form. Color somewhat darker (head and gaster dorsally dark brown). Somewhat thicker upright hairs on the body.

Type Locality: Pamir: Andermanyn Pass, 28.VI.95.

Myrmica laevinodis var. *neolaevinodis* Forel

M. rubra v. *neolaevinodis*, Forel, Mitt. Naturh. Mus. Hamburg, 1901, 18: 80, ♀.

Worker (after Forel): Length 4.3 mm.

Brown with reddish legs and red-brown antennae. The antennal scape is strongly bent as in *laevinodis* and somewhat shorter (extending past the occipital margin only a little). The medial funicular segments are quite as broad as long (somewhat longer than broad in *laevinodis*). Petiole considerably shorter, with scarcely concave (almost flat) anterior surface. The antennae, moreover, are somewhat shorter and thicker. The sculpture of the head and thorax is somewhat stronger. Otherwise as in *laevinodis*.

From New York, imported alive with Iris roots to the Plant Quarantine Station in Hamburg.

Myrmica laevinodis var. *tenuispina* Forel

M. rubra laevinodis tenuispina, Forel, Ann. Mus. Zool. St. Petersburg, 1904, 8: 374, ♀.

Worker (Cotype). Length 4.4 mm.

Head 0.6 as broad between the eyes as long (with mandibles), occipital corners and posterior margin evenly rounded, eyes about $\frac{1}{4}$ closer to the anterior clypeal margin than to the occipital margin; anterior clypeal margin distinctly convex; antennal scape exceeding the occipital margin by about twice its distal diameter, evenly bent at the basal $\frac{1}{4}$ – $\frac{1}{2}$; joints 1 and 2 of the funiculus together about equal to joints 3–5 together, antennal club 4-jointed. Thorax, in profile, evenly convex to the shallow, broadly depressed, mesoepinotal suture; epinotal spines slender, bluntly tipped, narrow at the base, projected backwards and upwards at about 40 degrees, a little shorter than the declivity ventral to them; from above, distinctly longer than the distance between their bases, moderately diverging. Petiole, in profile, a little longer from apex of ventral tooth to postpetiole, than it is high; peduncle with converging margins, node rising evenly and forming an anterior face of slight concavity which forms a rounded right angle with the weakly convex dorsal surface. Postpetiole, in profile, with distinctly convex dorsal, and weakly convex ventral, surfaces. Gaster sub-elliptical. Legs moderately long and slender.

Dorsal surface of head, including clypeus, longitudinally rugulose, sides reticulate-rugulose; frontal area distinct, rounded posteriorly, smooth and shining; base of sculpturing distinctly punctate. Thorax

shining, dorsal surface sparsely and longitudinally rugose-vermiculate, more rugose posteriorly, sides rugose, somewhat reduced in an antero-dorsal area; infraspinal surface of epinotum transversely striate. Pedicel rugulose-punctate, more sparsely dorsally. Base of gaster striate, otherwise smooth and shining.

Hairs of body moderately abundant, comparatively fine and acute; of appendages more abundant, reclining, subappressed on the legs; antennal club with coarse, appressed pubescence.

Color yellowish brown (darker than in the typical *laevinodis*), dorsal surface of head and median dorsal surface of gaster darker brown.

Type Locality: Ferghana: Kugart R., 6,-8,000 feet, 5.VIII.1895 (Kirzinskiz); Eastern Buchará; Karategin, Kala-i-choit, 21.VII, Tabidara-zagyrdescht, 17.VI, Darvas, Tasch-Kurgan, 22.VIII.1897 (Kaznakov), Samarkand.

Myrmica smythiesi Forel

M. smythiesi, Forel, Rev. Suisse Zool., 1902, 10: 226-227, ♀.

Worker (Cotype): Length 4.4 mm. (Length 3.4-4.5 mm., Emery).

Occipital margin straight; corners evenly rounded; clypeus produced slightly over the base of the mandibles in about a 145 degree angle; diameter of eyes fully twice the diameter of the distal end of the antennal scape; scapes clearly exceeding the posterior margin of the head; seen from behind, in the form of a sigmoid curve bent more at the proximal portion, distal end about twice the diameter of the proximal end; antennal club 3-4 jointed, funicular joints 1-2 together distinctly longer than joints 3-5 together; joints 3-6 of funiculus about as broad as long. Thorax, in profile, convex to the shallow mesoepinotal impression; epinotal spines, in profile, produced backwards and upwards at about a 50 degree angle, rather slender and acute, distinctly shorter than the declivity ventral to them; from above, about as long as the distance between their bases, widely diverging. Petiole, in profile, distinctly pedunculate, anterior face smoothly concave and meeting the slightly convex dorsal surface at a rounded right angle, distinctly longer from apex of ventral tooth to postpetiole than high. Postpetiole, in profile, distinctly higher than the petiole, about as long as high, anterior margin convex, posterior margin nearly plane. Gaster ovate. Legs moderately long and slender.

Surface of head rather finely and regularly sculptured, clypeus with about 8 rugae between the frontal carinae, frontal area clearly indicated, smooth and shining except at the striate margins; dorsal area finely and regularly rugulose, sides similar but with a few reticulations. Dorsal surface of thorax irregularly reticulate-vermiculate, sides rugose, somewhat vermiculate anteriorly. Pedicel regularly and finely rugulose, except on the dorsal surface of the petiole, densely punctate on the petiole, less on the postpetiole. Gaster smooth and shining but for short, fine basal striations. Legs and antennae shining, finely striate-punctate.

Pilosity rather scanty, fine, moderately long, mostly truncate dorsally, subappressed on the appendages; antennal club pubescent.

Color of body dark brown, gaster blackish brown, lighter apically; appendages brown.

Type Localities: Himalayas, 7,–12,000 feet, Deoban, 8,500 feet (Smythies); North West Himalaya (Gamble).

Other Localities: East Turkestan, East Siberia, Altai, 2,500 m. (after Emery); Middle Ussuri, Sidemi (Forel).

The affinities of this species seem with *M. rugosa* and, to a lesser extent, with *M. rubra*. The genitalia of the male of the subsp. *dshungarica* is distinct from that of any other form examined.

Myrmica smythiesi var. *bactriana* Ruzsky

M. smythiesi var. *bactriana*, Ruzsky, Ann. Mus. Zool. Petrograd, 1915, 20: 438–439, figs. 16–18, ♀ ♂.

Worker (after Ruzsky): Length 4–4.5 mm.

Epinotal spines shorter than in the type of the species, straight and slightly blunted apically; petiole a little shorter.

Sculpturing of the body, especially on the sides, rougher and more like in *dshungarica*.

Color darker than in the type of the species, thorax red brown, head and upper part of gaster blackish brown.

Male (after Ruzsky): Length 5–5.2 mm.

Antennal scape much as in *M. laevinodis*, about equal to the 6 following joints together, very feebly bent at the base and almost straight, about $\frac{1}{2}$ as long as the flagellum; antennal club 5-jointed. Epinotal declivity with blunt protuberances. Petiole, from above, rounded.

Surface of head nearly dull or a little shining, finely rugose, finely and densely punctate on the sides and back; clypeus smooth and shining. Thorax with longitudinal rugae but mostly more or less smooth; sides with rounded and shallow rugae. Petiole nearly smooth. Gaster smooth and shining.

Antennal scapes and legs with oblique hairs only.

Color blackish brown, tarsi and exposed parts of genitalia brownish. Wings with a brownish cast.

Type Locality: Tibet: Darendo, Upper part of Yangtse basin, August 8, 1900 (Kozlov).

Myrmica smythiesi subsp. *cachmiriensis* Forel

M. smythiesi subsp. *cachmiriensis*, Forel, Rev. Suisse Zool., 1904, 12: 23, ♀.

Worker (after Forel): Length 3.4–3.8 mm.

Differing from the typical species in its pedicel which has a very fine sculpture, almost dull, very finely reticulate-punctate; metanotum partly very finely wrinkled. The sculpturing of the head is a little more regularly wrinkled. Head and thorax subopaque. The spines are longer than their bases and, above all, much more slender. The peduncle of the petiole is longer, almost as long as the node, and is more abrupt anteriorly. The mesoepinotal impression is very profound, again more than in the type of the species, and the mesonotum has a median transverse impression. The posterior margin of the head is also more transverse, with the occipital angles well marked. Of a black ebony, varying to blackish brown, with the legs, antennae and margins of the mandibles brown.

Type Locality: Cachmir: Sind Valley, 2,286–2,438 m. (Wroughton).

***Myrmica smythiesi cachmiriensis* var. *lutescens* Forel**

M. smythiesi cachmiriensis var. *lutescens*, Forel, Rev. Suisse Zool., 1904, 12: 23, ♀.

Worker (after Forel): Length 3.2–3.7 mm.

Entirely dull yellow. Sculpturing identical with *cachmiriensis*, but less close and more shining. Peduncle of the petiole longer than the node; the latter more rounded.

Cachmir (Smythies):

"I possessed this variety a long time but did not have enough to determine it.

"It seems to constitute, with the preceding, a single race, considerably distinct from *carbonaria* Forel and the var. *rupestris*."

***Myrmica smythiesi* subsp. *carbonaria* Forel**

M. smythiesii v. *carbonaria*, Forel, Rev. Suisse Zool., 1902, 10: 227, ♀.

Worker (after Forel): Length 4 mm.

Color and pilosity of the var. *rupestris*; pilosity a little stronger. But the insect is more slender, the head narrower, the mesonotum more elevated (as in *rugosa*), the spines very slender, a little longer than the distance between their bases, strongly diverging, directed above and behind but more upright than in the typical species. The head, thorax and pedicel are entirely dull, densely and finely reticulate-punctate between the wrinkles.

"A single specimen from Pachmarhi (Schurr). I have perhaps wrongly attached this form, which has the appearance of a *Leptothorax*, to *M. smythiesii*. It is perhaps a separate species. The pedicel has exactly the form of that in *smythiesii*."

***Myrmica smithiesi* subsp. *dshungarica* Ruzsky**

M. rugosa dshungarica, Ruzsky, Formic. Imp. Rossici, 1905: 661–662, ♀.

M. smythiesi dshungarica, Emery, Deutsch. Ent. Zeitschr., 1908: 169, ♀.

Worker: Length 4.3–5 mm. (3.5–4.5 mm., after Emery).

Clypeus produced anteriorly over the base of the mandibles in the form of a 100-degree evenly rounded angle; eyes rather small, less than twice in diameter the diameter of the distal end of the antennal scape; antennal scapes barely extending to the occipital margins; seen from above, in the form of a long drawn-out sigmoid curve, evenly bent at the basal $\frac{1}{3}$, the basal diameter slightly over $\frac{1}{2}$ the distal diameter; antennal club 4-jointed, joints 1–2 of funiculus equal in length to 3–5 together. Thorax in profile, slightly compressed, with distinct, though rounded and shallow, mesoepinotal impression; epinotal spines, in profile, projected backwards and upwards as a 40–45 degree angle, stout, triangular with acute, deflected apices, appreciably shorter than the declivity ventral to them, from above, shorter than the distance between their bases, diverging. Petiole, in profile, with distinctly concave anterior face meeting the nearly flat dorsal surface at a sharp right angle, about as long from apex of ventral tooth to postpetiole as it is high; postpetiole, in profile, as high as the petiole and higher than its length, dorsal surface convex, ventral surface feebly convex. Gaster ovate. Legs of moderate length.

Surface of head between the frontal carinae moderately rugose, reticulate-rugose laterally, frontal area and posterior part of clypeus conspicuously smooth and shining, clypeus strongly rugose. Dorsal surface of thorax irregularly reticulate, becoming more rugose posteriorly, sides rugose. Dorsal surface of petiole irregularly wrinkled, sides more regularly vermiculate-rugose; dorsal surface of postpetiole strongly punctate, mostly smooth or a little sculptured, sides vermiculate-rugose. Gaster smooth and shining. Antennae and legs shining.

Pilosity moderately abundant, fine, acute, sub-appressed on the legs and antennae; antennal club with appressed pubescence.

Color red-brown, head and gaster dark brown; pilosity yellow.

Female (Dealate): Length 5.8 mm.

Similar to the worker. The epinotal spines, however, are shorter, the sculpturing of the head coarser, the pilosity more abundant and the color lighter. Scutum of the mesonotum anteriorly with an irregularly triangular, finely punctate, area from which extend posteriorly several regular rugae and laterally a series of coarse, irregular vermiculations; sides of thorax rugose; pronotum reticulate only anteriorly.

Male: Length 4.5-5.1 mm.

Clypeus produced in a rounded anterior margin over the mandibles; antennal scape equal in length to the following 5-6 segments together, slender, bent evenly at the basal $\frac{1}{4}$, slightly greater in diameter distally than proximally; antennal club 5-jointed. Epinotal declivity with two, low, inconspicuous gibbosities or none. Petiole as high as long, anterior face concave, dorsal part in the form of an evenly convex node, ventral surface slightly convex, ventral tooth practically absent. Postpetiole slightly higher than the petiole and than it is long, convex above and below. Gaster long-ovate. Legs moderately long and slender. Sagittae of genitalia with 24-26 serrations; volsellae as illustrated.

Surface of the head densely punctate, finely and irregularly vermiculate, with more or less regular longitudinal rugae between the frontal area and the anterior ocellus; frontal area clearly delimited, triangular with rounded posterior margins, finely punctate. Thorax shining, variably rugose-punctate. Pedicel finely punctate with a few marginal faint rugosities, a mid-dorsal area on the petiole and a larger dorsal area on the postpetiole smooth and shining. Gaster smooth and shining.

Pilosity moderately abundant, very fine and acute, subappressed fine hairs on the appendages; appressed pubescence on the antennal clubs.

Color black, appendages and apex of gaster dark brown. Pilosity pale yellow. Wings hyaline with a brownish cast, veins and stigma brown.

Type Locality: Tscunjetschi Region (Dshungaric Altai), altitude 2,000 meters, border of an alpine meadow. Taken by Tsapaschnikoff, March 29, 1902.

Other Localities: Turkestan: Karkara, Central Tian-Schan, 2,-2,600 mm.; Dshityoguz, S. of Tssykkul Lake, alt. 2,600 meters (N. N. Kuznetsov- Ugamskiji); Za-Tlijsk, Alatau Mts. (Dshenishke). Siberia: Issil-Kul (no collector).

Myrmica smythiesi subsp. *exigua* Ruzsky

M. smythiesi subsp. *exigua*, Ruzsky, Ann. Mus. Zool. Acad. Imp. Sc. Petrograd; 1915, 20: 440, figs. 19-20, ♀ ♂.

Worker (after Ruzsky):

Distinguished by shorter, thicker and wider epinotal spines. These are broad at the base, then narrow abruptly apically to slender, though blunted, apices.

Head a little shorter and wider than in *bactriana*; clypeus produced anteriorly in the form of a rounded angle; antennal scape shorter and thicker.

Male (after Ruzsky): Length 5 mm.

Thorax thinner than in *bactriana* and body generally smaller. Head and thorax dull and finely rugulose, otherwise as in *bactriana*.

Color brighter and dark brown. Wings with a darker cast.

Type Locality. Bar-Chu River, 12,000 feet, Yangtse basin, August 2, 3, 1900 (Kozlov).

Myrmica smythiesi var. *fortior* Forel

M. smythiesi var. *fortior*, Forel, Rev. Suisse Zool., 1904, 12: 22-23, ♀.

Worker (after Forel): Length 4.2-4.5 mm.

Sculpturing stronger and less close than in the typical species. Similarly shining. Spines longer, rather longer than in their interval. Mesocpinotal impression feebler, little accentuated. Petiole a little more truncate anteriorly. Postpetiole shining (Emery). Dull brown, thorax, antennae, mandibles and legs a dull yellowish brown.

Sind Valley, 1891 m., Cachmir (Wroughton); Deota, 914 m., North West Himalaya (Smythies); East Siberia (Museum of St. Petersburg).

"This variety passes through all the transitions to the typical form and, on the other hand, to the var. *debilior* Forel and *rugosa* Mayr."

Myrmica smythiesi subsp. *himalayana*, subsp. nov.

Worker: Length 4.4-4.6 mm.

Closely resembling the cotype of the typical form but differing distinctly in the following characters:

Occipital margin slightly, but distinctly, impressed medially, angles evenly rounded. Epinotal spines reduced to acutely pointed teeth; seen from above, shorter than the distance between their bases, moderately diverging.

Striae at the base of the gaster almost wanting, much less distinct than in the typical *smythiesi*.

Type Locality: India: Simla (Wroughton).

Described from three workers in Dr. W. M. Wheeler's collection.

The variety *bactriana* Ruzsky is described with short epinotal spines, which, however, are blunted apically but the sculpturing is rougher and the color is darker. A subspecies *exigua* Ruzsky is also described with shorter epinotal spines than in the typical species but the head is shorter and wider, the anterior clypeal border rounded, and the antennal scape shorter and thicker.

Myrmica smythiesi subsp. *hecate*, subsp. nov.

Worker: Length 5.2–5.7 mm.

Occipital margin of head slightly impressed medially; angles evenly rounded; anterior clypeal margin produced over the base of the mandibles in a rounded lobe of about 115 degrees; antennal scape exceeding the occipital margin by a distance equal to more than its distal diameter; joints 1 and 2 of the funiculus together slightly shorter than joints 3–5 together; club 4-jointed. Thorax, in profile, feebly concave to the broad and shallow mesoepinotal impression; epinotal spines slender, acute, directed backwards and upwards at about 30 degrees, shorter than the declivity ventral to them; from above, about $1\frac{1}{2}$ times as long as the space between the bases, feebly diverging. Petiole, in profile, longer, from apex of ventral tooth to postpetiole, than high, anterior declivity clearly concave and meeting the dorsal surface at a subangular right angle. Postpetiole, in profile, as high as long, dorsal surface convex, ventral surface nearly flat, ending anteriorly as an acute angle. Gaster subelliptical. Legs moderately long and slender.

Surface of head more coarsely sculptured than in the typical form, frontal are smooth and shining, median dorsal surface longitudinally rugulose, laterally becoming reticulate. Dorsal surface of thorax thinly and very irregularly sculptured, mostly vermiculate anteriorly and longitudinally rugulose posteriorly; sides irregularly rugulose, somewhat vermiculate anteriorly. Base of sculpturing of head and thorax mostly smooth and shining, few punctations. Sides of pedicel sparsely rugulose, densely punctate; dorsal surfaces with obscure rugulosity, densely punctate. Base of gaster with faint, sparse striae, otherwise smooth and shining. Antennal scapes sparsely and finely striate; legs microscopically striate-reticulate.

Pilosity of body moderately long, fine and acute; appendages with more numerous subappressed hairs; antennal club and tarsi with appressed pubescence.

Color dark blackish-brown, appendages dark brown.

Described from two workers with the Indian Museum labels "sweepings in grass and low herbage, Brunetti, Darjiling, 6,000 feet, 24.IX.08, No. 8607–19" and "Botanical gardens, Darjiling, 6,900 ft., 7.VIII.09, C. Paiva, No. 8609–19."

There are slight differences between these two Himalayan specimens but hardly sufficient to justify separate names.

In the length of the epinotal spines, sculpturing of the pedicel and color this subspecies resembles the subsp. *cachmiriensis* Forel. The sculpturing of the head, the occipital margin, the mesoepinotal impression and the size are quite different.

Myrmica smythiesi var. *rupestris* Forel

M. smythiesii var. *rupestris*, Forel, Rev. Suisse Zool., 1902, 10: 227, ♀.

Worker (after Forel):

General habitus as in the typical form but black, with the sculpture stronger than in *rugosa*, the pedicel strongly sculptured, the scapes reticulate, the pubescence of the tibiae oblique, the petiole more elongate (much longer than broad); otherwise as in the type.

Type Locality: North West Himalaya: Ekra Peak, 9,500 feet (Smythies).

Myrmica rugosa Mayr

Myrmica rugosa, Mayr, Reise Novara, Formicid., 1865: 19, note, ♀.

Worker (Cotypes): Length 5-6 mm.

Head about 0.65 as broad between the eyes as long (with mandibles). Occipital margin of head straight; occipital corners broadly rounded. Clypeus produced over the base of the mandibles in an angulate lobe of about 130 degrees; eyes less than twice as large in diameter as the distal diameter of the antennal scapes; scapes exceeding the posterior margin of the head appreciably; seen from above, bent smoothly at the basal $\frac{1}{2}$ and very slightly at the distal end, distal end twice as wide as at the base; antennal club 4-jointed. Thorax, in profile, irregularly convex, distinctly impressed at the mesoepinotal suture; epinotal spines, in profile, produced backwards and upwards at about a 55-65 degree angle, narrow, straight and acutely pointed, a little shorter than the declivity ventral to them; from above, about as long as the distance between their bases, diverging. Petiole, in profile, distinctly pedunculate; anterior face concave, meeting the slightly convex dorsal surface at a rounded right angle; about $\frac{1}{2}$ longer from apex of ventral tooth to postpetiolar border than high. Postpetiole, in profile, about $\frac{1}{2}$ higher than the petiole, slightly higher than long, dorsal margin distinctly, ventral margin slightly, convex. Gaster ovate. Legs moderately long and slender.

Surface of the head coarsely sculptured; frontal area triangular, smooth and shining; clypeus and median dorsal area coarsely rugose, sides rugose-reticulate. Entire dorsal surface of thorax coarsely reticulate-vermiculate, sides rugose, anteriorly somewhat vermiculate. Dorsal surface of petiole deeply vermiculate, sides vermiculate-punctate. Post-petiole coarsely vermiculate-punctate. Gaster smooth and shining. Legs and antennal scapes finely striate-punctate.

Pilosity moderately abundant and long, mostly obtuse dorsally; subappressed to appressed hairs on the legs and antennae, antennal club coarsely pubescent.

Color of body blackish brown, appendages dark brown; pilosity pale yellow.

Type Locality: Himalaya.

Males of this species have not been reported but, judging from the workers, the species seems closest to *M. smythiesi* and *M. rubra*.

Myrmica rugosa* subsp. *arisana Wheeler

M. rugosa var. *arisana*, Wheeler, Proc. New England Zool. Club, 1930, 11: 95, ♀.

Worker: Length 5.6-6 mm.

Clypeus but slightly produced over the base of the mandibles and with evenly convex anterior margin; diameter of eyes nearly twice that of the distal end of the antennal scape; scape extending beyond the occipital margin by a distance equal to slightly more than its distal diameter; seen from a posterior view, bent, at its basal $\frac{1}{2}$, evenly inward at about 40 degrees, distal diameter about twice that of the proximal end; joints 1-2 of the funiculus together equal in length to joints 3-5 together, antennal club 4-jointed. Thorax, in profile, irregularly convex to the deep mesoepinotal suture; epinotal spines produced

backwards and upwards at a 45 degree angle, broad at the base, slender and exceptionally acute apically, longer than the declivity ventral to them; from above, feebly diverging, $1\frac{1}{2}$ times as long as the distance between their bases. Petiole, in profile, comparatively small, anterior face feebly concave, meeting the dorsal, slightly convex, surface at a rounded obtuse angle, length from apex of ventral tooth to postpetiole equal to the maximum height. Postpetiole, in profile, distinctly higher than the petiole; produced, on the dorsal surface, backwards as a large convexity, and, ventrally, as a smaller, anterior convexity. Gaster ovate. Legs long and slender.

Surface of the head moderately sculptured and shining, clypeus with about 8 rugae between the frontal carinae, frontal area distinct, triangular, smooth but for feeble rugae, dorsal surface rugose, sides reticulate-rugose, base of sculpturing punctate. Dorsal surface of thorax coarsely and irregularly reticulate-vermiculate, sides rugose, anteriorly somewhat vermiculate. Dorsal surface of petiole densely punctate, sides thinly rugose; mid-dorsal area of postpetiole somewhat smooth, finely reticulate, remainder sulcate- or feebly rugose-punctate. Gaster smooth and shining. Antennae and legs finely striate.

Pilosity rather thin, hairs long, slender and acute, subappressed on the appendages; antennal club with appressed pubescence.

Color of body dark brown, appendages and apex of gaster yellowish brown.

Type Locality: Formosa: Arisan (R. Takahashi), April 24, 1928.

Six workers taken in 1932 by L. Gressitt from the type locality are a trifle smaller, darker and more shining but merely illustrate the customary variation in this genus.

Arisana is clearly distinct from the typical form in deeper mesoepinotal impression, longer epinotal spines and smoother sculpturing on the pedicel.

Myrmica rugosa var. *debiliior* Forel

M. rugosa var. *debiliior*, Forel, Rev. Suisse Zool., 1902, 10: 228, ♀.

Worker (Cotypes): Length 4.2-5 mm.

Clypeus produced over the base of the mandibles as a more or less angulate flattened lobe of about 130 degrees; antennal scapes clearly exceeding the posterior margin of the head; seen from a postero-dorsal view, in the form of a sigmoid curve with the basal $\frac{1}{4}$ evenly bent; distal end about twice the diameter of the basal end; antennal club 4-jointed. Thorax, in profile, evenly convex to the distinct, but shallow, mesoepinotal suture; epinotal spines, in profile, projected backwards and upwards at a 40-45 degree angle, slender, acute, from about as long to distinctly longer than the declivity ventral to them; from above, over $1\frac{1}{2}$ times the distance between their bases, widely diverging. Petiole, in profile, with a distinct subcylindrical peduncle and a convex node rising evenly from the dorsal surface, posterior part of pedicel slightly pedunculate; distinctly longer from apex of ventral tooth to ventral junction with postpetiole than high at the node. Postpetiole, in profile, distinctly higher than the petiolar node or than it is long, dorsal convex surface produced posteriorly, ventral surface produced anteriorly as an acute lobe. Gaster ovate. Legs moderately long and slender.

Surface moderately and regularly sculptured, clypeus sparsely rugose, shining; frontal area distinct, smooth and shining; head longitudinally rugose, somewhat reticulate-rugose on the sides; interrugal surfaces punctate. Dorsal surface of thorax sparsely and irregularly reticulate, smooth and shining between; sides irregularly and feebly sculptured, somewhat reticulate anteriorly, vermiculate medially and rugose posteriorly; with occasional punctations. Pedicel densely punctate with a few scattered rugae. Gaster smooth and shining. Legs and antennae shining, finely punctate-striate.

Pilosity sparse, hairs long, fine, acute or truncate, subappressed on the legs; appressed pubescence on the antennal clubs.

Color of body black, appendages dark brown.

Type Localities: Himalaya, Deota (Smythies); Darjiling, 3,-8,000 feet, Northern India (Wroughton); Mysore (Rothney); Kāmáon (Schlagintweit).

The densely punctate pedicel and the dark color distinguish this variety from the other known forms.

Myrmica rugosa var. *kirgisica* Ruzsky

M. rugosa var. *kirgisica*, Ruzsky, Horae Soc. Ent. Rossicae, 1903, 36: 314.

Worker (after Forel and Emery):

Head broader and shorter than in the type, more weakly wrinkled. Mesonotum and epinotal spines shorter, almost as in the var. *debilior* Forel. Color as in the type, only antennae and tarsi lighter brown.

Type Locality: Astrakhan.

Forel, who saw the type specimen, believed it to be a form of *rubra* s. lat., probably in the neighborhood of *r. rubra* and *sulcinodis*, rather than of *rugosa*. The status of this variety must await the discovery of males.

Dr. C. Menozzi had generously sent me the following descriptions of two new species from the Himalayas. The descriptions and comments are his.

Myrmica aimonis-sabaudiae Menozzi, n. sp.

Operaria: Obscure brunneo-rufa, gaster niger, mandibulae, antennae et pedis brunnei. Caput opacum, profunde straito-rugosum, genis et occipite confuse reticulatis; clypei longitudinaliter striato, antice in lobum subacutum producto; mandibulis striatis, 8-10 dentatis; antennarum scapo basi curvato; flagellum clava 4-articulata. Thorax lateribus et mesonoto longitudinaliter rugosis; pronoto transversim rugoso, epinoti basi subtiliter striati, superficie declivi nitida, spinis gracilibus longissimis, suberectis; sutura promesonotali obsoleta, mesoepinotali impressa. Segmentum pediculi primum breviter petiolatum, nodo supra rotundato, secundum pyriforme, vel subconicum, latius quam longius, anebo subtiliter punctato-striati. Pedes breviter oblique pilosi.

Long. mm. 5-5.5.

Habitat.—Karakorum (Himalaya).

Pour la constriction mésoépinotale très marqué cette nouvelle

Myrmica se rattache au groupe de *M. smythiesi* For. Est très semblable à *M. rugosa* Mayr mais avec le pétiole presque sessile et les articles 2-7 du funicule bien plus courts. Différé de *M. smythiesi* par les épines plus longues et par la sculpture.

***Myrmica dicaporiacoi* Menozzi, n. sp.**

Operaria: Nigra, antennis, pedibus et gatri articulis postremis brunneo-rufescentibus, genibus, coxis et collo luteolis. Caput rugoso-striatum, spatiis inter rugas et strias punctulatis; dorsum et latera promesonoti rugosa; epinotum et pediculum punctulatis, gaster laevis et lucidus. Mandibulae vix striatae. Clypeus in *M. rugosa* Mayr elongatus, sed ossovis striatus et opacus. Scapus marginem occipitale superans; primus et secundus funiculi articuli subaequales, 3-8 paulo longiores quam latiores; clava tribus articulis sistens. Oculi fortiter convexi et valde prominentis. Thorax sutura meso-epinotali vix conspicua, meso-pronotali obsoleta. Epinotum parte basalis quam declivi longiore, spinis brevibus apice vix incurvatis. Petiolum breviter pedunculatum, nodo parvo; postpetiolum antice et postice aequè angustatum.

Long. mm. 4.

Habitat.—Karakorum (Himalaya).

Du groupe *M. rugosa* Mayr; se distingue facilement par la sculpture, les épines courtes mais surtout par les yeux petits, assez convexes et beaucoup saillants en dehors des cotés de la tête.

***Myrmica tibetana* Mayr**

M. tibetana, Mayr, Hor. Soc. Ent. Rossicae, 1890, 24: 279, ♀; Emery, Deutsch. Ent. Zeitschr., 1908: 181-182, fig. 13, ♀; Ruzsky, Ann. Mus. Zool. Acad. Sc. Petrograd, 1915, 20: 440-1, fig. 21, ♀ ♂.

Worker (after Mayr and Emery): Length 3.2-3.5 mm.

Noteworthy for the compact habitus. Form of the head about as in *rubra*, except that the antennae are shorter, the segments before the 4-jointed club are as broad, or somewhat broader, than long. Thorax short and high, mesoepinotal impression strong; epinotal spines very short and broad at their bases, a little diverging. Petiole short and thick, with slightly concave anterior face. Postpetiole as broad as long.

Sculpturing of the head as in *laevinodis*; of the thorax, very fine, the surface dull or weakly shining, reticulate to reticulate-rugose; of the pedicel shining, slightly reticulate laterally, above smooth.

Pilosity much as in *laevinodis* but the erect hairs shorter; legs and antennae with copious, oblique and subappressed hairs, here and there with appressed pubescence.

Color light reddish brown, head and gaster brown.

Male (after Ruzsky): Length 4-4.9 mm.

According to Ruzsky's figure the antennal scape is subcylindrical, somewhat narrowed and a trifle bent at the base and is equal to the following 4-5 segments together. The antennal club is 5-jointed.

Type Locality: North Tibet: Jumel-Kuku Mt., April-June, 1884.

Myrmica tibetana subsp. **chinensis** Viehmeyer

M. chinensis, Viehmeyer, Archiv. f. Naturg., 1922, 88: 204, ♀ ♂.

Female (after Viehmeyer): Length 5 mm.

Distinguished from *tibetana* Mayr by the short, at the base gently curved, scape of the antenna and by the smooth part of the pedicel. Head somewhat shorter than in the worker of *tibetana*, the occipital margin a little more rounded, sides more even than in *laevinodis*, antennal scape not quite reaching the occipital margin (in the *tibetana* worker it surpasses by a trifle). Epinotal spines at least as long and quite similar to *laevinodis*, the space between them smooth and shining. Petiole, in profile, very sharply angular, postpetiole clearly transverse. Blackish brown to black, the legs more or less brown, the wings somewhat strongly smoky. Upright hairs yellowish, shorter than in *laevinodis*. Sculpturing very similar to that in *laevinodis*, barely weaker; eyes, however, less projecting and the petiole more or less sculptured.

Male (after Viehmeyer): Length 3.5 mm.

Head dull, extremely finely reticulate, the upper surface of the mandibles longitudinally rugose. Antennal scape exceeding the occipital margin a good deal, at the base weakly bent, the club clearly 5-jointed, differing from Ruzsky's illustration of the *tibetana* ♂ in being more slender. Epinotal angles sharper than in *laevinodis*, but without teeth. Thorax finely and longitudinally rugulose, but shining; the remainder of the body strongly shining. Only the legs with shorter, appressed pubescence. Color black, legs brownish black, wings as in the female.

Type Locality: China: Szechwan Province: Sungpanting (Stötzner Expedition of 1914).

"Perhaps only a form of *tibetana* and near its variety *furva* Ruzsky."

Myrmica tibetana var. **furva** Ruzsky

M. tibetana var. *furva*, Ruzsky, Ann. Mus. Zool. Acad. Imp. Sc. Petrograd, 1915, 20: 440-441, ♀.

Worker (after Ruzsky):

Differs from the typical form in deeper sculpture and darker color.

Type Locality: Tibet: Yangtse River region, 12,-12,500 feet, March, May, 1901 (Kozlov).

Myrmica commarginata Ruzsky

M. commarginata, Ruzsky, Formic. Imp. Rossici, 1905: 708-709, ♀.

Worker (after Ruzsky and Emery): Length 3.7 mm.

Dark reddish brown, antennae and legs lighter, head and gaster dorsally blackish brown. Head and thorax dull, coarsely wrinkled; declivous surface of epinotum between the spines smooth; nodes of the pedicel somewhat shining and finely wrinkled; gaster smooth. Head long with rounded occipital margin; eyes situated a little before the middle of the sides of the head; frontal area smooth; mandibles longitudinally striate, with 6 teeth; scape at the base bent in a curve, funiculus with 4-jointed club. Mescēpinotal impression small, not deep. The mesoepinotal region strongly compressed and, on either side, dorsally

with a carina which extends from the pronotum to the base of the spines. Epinotal spines not longer than half the basal surface (declivity ventral to them), diverging and broad at the base and somewhat laterally compressed, the apices somewhat curved. Petiole short, anterior face forming an angle with the dorsal, very weakly convex, surface, without a cylindrical peduncle. Postpetiole somewhat higher than the petiole, broader and of similar form. Upright hairs somewhat thick on the head and gaster, thinner on the thorax and pedicel, legs shining, with sparse, thin, reclining hairs.

Type Locality: Transbaikal: Tabajkal region, 27.VII.1901.

"This species is very distinct in the lateral carinae and narrowness of the thorax."

Myrmica inezae Forel

M. inezae, Forel, Rev. Suisse Zool., 1902, 10: 226, ♀.

Worker (after Forel): Length 5.2 mm.

Black. Legs, antennae, mandibles and apex of gaster russet-brown. Pilosity moderately erect, yellowish red, oblique, short and very abundant on the tibiae and scapes. Gaster, frontal area and epinotal declivity smooth. Legs and scapes reticulate and subopaque, the scapes also wrinkled. All the rest (including the mandibles) grossly wrinkled, rough between the wrinkles, the pedicel more feebly sculptured. The ridges are longitudinal on the head, *transverse* on the pronotum, the mesonotum and between the spines, irregular on the margins and on the metanotum. Mesoepinotal impression feeble. Epinotal spines subvertical, inclined backwards, a little longer than in *M. rugosa* (where they are subhorizontal), almost as long as the basal face. The petiole with a long, slender pedicel, much longer than the node, which is more subcubic, broader at the summit than in *rugosa* (less cuneiform). Postpetiole as in *rugosa*. Otherwise as in *rugosa*. Not the metasternal spines.

"A single worker from Pachmarhi (Schurr). Much different from *ritae* and *margaritae*, which have the metasternal and epinotal spines much longer; this species is distinguished from *rugosa* by the petiole, the transverse wrinkling and its subvertical spines."

Myrmica pachei Forel

M. pachei, Forel, Bull. Soc. Vaud. Sc. Nat., 1906, 42: 79-82, ♀ ♀ ♂.

Worker (Cotype): Length 5-5.5 mm. (after Forel).

Head, between the eyes, 0.6 as broad as long (with mandibles), anterior clypeal margin convex, eyes, in breadth, twice the diameter of the distal end of the antennal scape; scapes surpassing the posterior margin of head by $\frac{1}{2}$ their length, seen from behind, in a drawn-out sigmoid curve, bent at basal $\frac{1}{4}$ and close to distal end, proximal diameter $\frac{1}{2}$ that of distal end; antennal club 4-jointed, joints 1-2 of the funiculus together as long as joints 3-5 together. Thorax, in profile, unusually convex to the moderately impressed mesoepinotal impression; epinotal spines slender, straight, projected backwards and upwards at slightly less than 40 degrees, slightly shorter than the declivity ventral to

them; from above, diverging, over $1\frac{1}{2}$ times as long as the distance between their bases. Petiole, in profile, stout, anterior face slightly concave, dorsal surface evenly convex, distinctly longer from apex of ventral tooth to postpetiole than high. Postpetiole, in profile, distinctly higher than the petiole or than it is long, dorsal surface highly convex, ventral surface nearly plane, produced anteriorly in an acute small lobe. Gaster ovate. Legs moderately long and slender.

Surface of head shining, finely and evenly rugulose, densely punctate between; mandibles rugulose; clypeus shining, sparsely rugulose, punctate; frontal area smooth and shining. Dorsal surface of thorax *transversely* and densely rugulose, lateral surfaces rugulose, longitudinally basally, more vertical dorsally, anterior part thickly punctate. Pedicel finely reticulate-punctate with a few marginal, scattered and feeble rugae. Gaster smooth and shining. Legs and antennae finely striate.

Pilosity sparse, fine and acute; subappressed hairs on the appendages; antennal club pubescent.

Color dark brown, appendages hardly lightly, gaster piceous.

Female (after Forel): Length 5.6–5.8 mm.

Thorax narrower than the head. Longitudinal striae on the mesonotum; epistome more rugose. Wings brown, with the cubital cell divided into thirds by the intersection of a vein, as in the other species of the genus. Otherwise as in the worker, and hardly larger.

Male (after Forel): Length 5–5.7 mm.

Mandibles triangular, feebly sculptured, armed with about 6 teeth. Head slightly trapeziform, larger posteriorly than anteriorly, at the posterior margin slightly, and at the other margins more strongly, convex. Eyes nearly at the anterior third. The scapes, bent towards their base, surpassing the occiput by about $\frac{1}{2}$ of their length. Second joint of the funicle distinctly longer than the first and the third. The metanotum armed with two triangular teeth. Petiole very convex dorsally, as long as broad.

Epistome transversely striate only on its anterior $\frac{3}{4}$, smooth and convex behind. Frontal area smooth. Head striate as in the worker, but more strongly reticulate and dull to nearly dull. The striae in the middle of the front are compact, converging to a point, the extremity of the frontal area, and describing an elliptically convex bend about the frontal groove. They run from the front of the margin to the frontal area and diverge simply anteriorly. The head is sprinkled with punctations at the base of the striae. Sculpture of the thorax as in the female, but feebler. Posterior half of the metanotum smooth. Pedicel subopaque, finely reticulate, likewise the legs and scapes.

Color, pilosity and wings as in the female, but the teeth of the metanotum are black and the legs almost black. Wings less brown (more clear).

Type Locality: N. E. Nepal: Tersam, 3,600 meters (Pachei); from a colony in a tree trunk.

The fine sculpturing and especially the transversely and finely rugulose sculpturing of the thorax distinguish this *Myrmica* from all other known species.

Myrmica kurokii Forel

M. rubra v. *kurokii*, Forel, Mitt. Naturh. Mus. Hambur., 1907, 24: 18, v.

Worker (after Forel): Length 5-5.2 mm.

Mandibles striate, with more or less curved, nearly even, outer border and 7 teeth. Clypeus strongly curved anteriorly as in the European *rubra*, but less than in *M. rugosa* Mayr. Frontal area smooth. Base of the scape somewhat roughly bowed as in *ruginodis* Nyl., but not as roughly as in *sulcinodis*; club 4-jointed (Emery). Head right-angled, with very clear, but only slightly indicated median impression. Scape exceeding the occipital margin a little. Thorax similar to that of *ruginodis* and especially similar to the form which Ruzsky has called *rugosa* var. *kirgisica*, and which by no means belongs to *rugosa*, but to *rubra*, in the neighborhood of *ruginodis* and *sulcinodis*, however, the mesoepinotal impression is shallower and broader. The petiole is very short, not as short and thick as in *brevinodis* Emery, but, however, cuboidal, with a rounded, broad upper surface and not a blunt edge as in *kirgisica*. Postpetiole flatter than in *sulcinodis* (Emery). The spines are also much longer than in *kirgisica*, somewhat as in *sulcinodis* and somewhat deflected. 3-6 funicular segments somewhat broader than long.

Somewhat less coarsely rugose longitudinally than in *kirgisica* and *sulcinodis*, but coarser than in *ruginodis*. Metanotum smooth between the spines. Pedicel coarsely rugose. Abdomen smooth (short and finely striate at the base—Emery). Uneven between the rugosities, therefore little shining. Legs and antennal scape only with thick, somewhat fine, appressed hairs. Body with scattered yellow upright hairs.

Head and gaster brown, the latter dark brown; the remainder reddish brown.

"Differing from *kirgisica* in the petiole and the much more strongly curved clypeus. Through the much longer spines and the broader, even occipital margin, likewise clearly differentiated from the other subspecies."

Type Locality: Japan (ex. coll. Frühstorfer).

Three workers from the Southern Japanese Alps (H. Yoshioka coll.) appear referable to this species although larger (5.3-6.1 mm.) and with the frontal area distinctly, though finely, striate. The head is about 0.67 as broad between the eyes as long (with mandibles). This is a very distinct species.

Myrmica kurokii subsp. *helleri* Viehmeyer

M. helleri, Viehmeyer, Arch. f. Naturg., 1922, 88: 204-205, v.

Worker (after Viehmeyer): Length 5.5 mm.

"Nearest to *M. kurokii* Forel of Japan; differing clearly from it, however, in the essentially stronger sculpturing."

Blackish brown, the legs a little lighter. Anterior part of the body, including the frontal area and the declivous surface between the epinotal spines, dull. Head somewhat coarsely and longitudinally, thorax con-

fusedly, pedicel, especially the postpetiole, somewhat finely, rugose; interrugally with extremely fine reticulations, laterally and posteriorly on the head, between the rugosities, with shallow pits. Head somewhat broader and shorter than in *kurokii*, with even sides and the occipital corners more distinct than in *sulcinodis*. Antennal scape as in *rubra*, at the base broadly and weakly bowed; club 4-jointed, the anterior ("vorderen") joints somewhat shorter than in *kurokii*. The pedicel similar in profile, but the weakly concave anterior surface of the petiole is somewhat longer and the dorsal surface slopes more strongly away from the angle. Postpetiole more weakly transverse. Otherwise entirely as in *kurokii*. "Perhaps only a form of it."

Type Locality: China: Szechwan Province: Kwansien (Stötzner Expedition of 1914).

***Myrmica kurokii* subsp. *sontica* Santschi**

M. kurokii v. *sontica*, Santschi, Bull. Ann. Soc. Ent. Belg., 1937, 77: 367, ♀.

Worker (after Santschi): Length 5-5.5 mm.

More elongated petiole than in *kurokii*; basal face of epinotum between the spines reticulate in the large and medium individuals, more feebly and more longitudinally sculptured in the small; petiole reticulate-punctate, postpetiole more shining, with the ridges elongate; gaster shining with short basal striae; dark brown, sides and sterna paler, appendages russet and brighter.

Type Locality: Japan: Yamakita (C. Teranishi).

***Myrmica kurokii* subsp. *tipuna* Santschi**

M. kurokii st. *tipuna*, Santschi, Bull. Ann. Soc. Ent. Belg., 1937, 77: 367-368, ♀.

Worker (after Santschi): Length not given but presumably as in *sontica*.

Distinguished from *sontica* chiefly by the more feeble sculpture of the pedicel and the more "claire" color of the abdomen. Mandibles 7-8-toothed, apical very long, striate; scape bowed and slender as in *rubra*; eyes and antennae also as in *rubra*; epinotal spines fine, as long as the interval between their apices but a little shorter than in *rubra*; the petiole as in *rubra* or a little larger, the anterior pedicel longer as in *kurokii*. Evidently a form based chiefly on sculpture and color.

Type Locality: Formosa (K. Sato).

***Myrmica kozlovi* Ruzsky**

M. kozlovi, Ruzsky, Ann. Mus. Zool. Acad. Imp. Sc. Petrograd, 1915: 435-436, figs. 10-11, ♀.

Worker (after Ruzsky): Length 5-6 mm.

Head short, rounded posteriorly, clypeus convex, anterior margin rounded, frontal carinae small; antennal scape extending to the thorax, bent evenly at the base, antennal funiculus 4-jointed. Promesonotum feebly convex, metanotum flat dorsally, mesoepinotal impression feeble; epinotal spines well developed, broad at the base, produced backwards, feebly divergent, with the apices sometimes a little deflected. Pedicel short as in *M. sulcinodis*; petiole much shortened and with a short,

Myrmica kozlovi subsp. **subbrevispinosa** Ruzsky

M. kozlovi subsp. *subbrevispinosa*, Ruzsky, Ann. Mus. Zool. Acad. Imp. Sc. Petrograd, 1915, 20: 437, fig. 12, ♀.

Worker (after Ruzsky): Length 5 mm.

Differs from the typical form and from *mekongi* in the form of the epinotal spines. These are short, thickened, and directed almost straight backwards.

Type Locality: Tibet: Yangtse Basin, March, 1901, (Kozlov).

Myrmica bergi Ruzsky

M. bergi Ruzsky, Zool. Jahrb. Syst., 1902, 17: 473, ♀; Ruzsky, Formic. Imp. Rossici, 1905: 675-678, figs. 167, 168, ♀ ♀ ♂; Kuznetsov-Ugamskij, Zool. Anz., 1929, 83: 44-45, map.

Worker (Cotype): Length 4.6 mm. (4.5-5.5 mm., after Ruzsky).

Head 0.64 as broad between the eyes as long (with mandibles), occipital margin straight, occipital corners evenly rounded, eyes slightly closer to the anterior clypeal than to the occipital margin; anterior clypeal margin transverse. Antennal scape slightly exceeding the occipital margin, seen from a posterior view, bent at about the basal $\frac{1}{4}$ in a rounded angle of about 30 degrees; joints 1 and 2 of the funiculus together about as long as joints 3-5 together, all joints longer than broad, club 4-jointed. Thorax, in profile, very evenly convex to the feeble and broad mesoepinotal impression; epinotal spines acutely pointed, straight, projected backwards and upwards at about 45 degrees, shorter than the declivity ventral to them; spines, from above, a little longer than the distance between their bases, slightly diverging. Petiole, in profile, short, peduncular margins converging anteriorly, anterior face slightly concave, a little shorter, from apex of ventral tooth to postpetiole, than it is high. Postpetiole, in profile, distinctly higher than the petiole and than it is long, dorsal margin convex and produced posteriorly, ventral margin convex and produced anteriorly. Gaster sub-elliptical. Legs of moderate length.

Surface of head shallowly sculptured; median dorsal surface, including clypeus, finely and closely rugulose, sides rugulose-reticulate, densely and conspicuously punctate between the sculpturing, frontal area clearly indicated, striate at the posterior margins, smooth and shining anteriorly. Dorsal surface of thorax irregularly sculptured with a general longitudinally rugose tendency, mesonotum with several nearly smooth areas, infraspinal surface of epinotum with fine transverse striae; sides of thorax longitudinally rugose; interrugal surfaces densely punctate, especially on the sides. Petiole rugose-punctate; postpetiole more shallowly rugose-punctate with a finely striate-punctate longitudinal area on the dorsal surface. Thorax smooth and shining. Antennal scapes finely striate; legs shining, indistinctly sculptured.

Pilosity moderately sparse, hairs of body, including those of dorsal thoracic surface, acute and moderately fine; moderately abundant and reclining on the appendages; antennal club with appressed pubescence.

Color of body reddish brown, slightly darker dorsally and with gaster dark brown; appendages reddish brown.

Female (after Ruzsky and Emery): Length 5.5-6.5 mm.

Color, sculpturing and pilosity about as in the worker; epinotal spines broad at the base, almost straight, pointed.

Male (after Ruzsky and Emery): Length 5 mm.

Clypeus and frontal area shining; head and thorax dorsally wrinkled; nodes of the pedicel shining. Scape about as long as $\frac{1}{3}$ the funiculus or a little shorter than the 4 following joints; club 4-jointed. Epinotum with rounded gibbosities. Posterior femora not clearly incrassate in the middle. Pilosity of the tibiae about as in *sulcinodis*. Castaneous brown, darker dorsally. Wings dark.

Type Localities: Turkestan: Tas-Bulak, west coast of the Aral Sea; mouth of the Syr-Daja; Ack-Dshalpas, north shore of the Aral Sea (H. L. S. Berg, 1900-1).

Turkestan: Gschimkent (Cimkent), South Kazakhstan, Kirgisen Steppe, Turkmenistan (N. N. Kuznetsov-Ugamskij).

Transcaucasia.

Ruzsky and Emery placed this species next to *sulcinodis* Nylander because of the form of the worker antennal scape. The short antennal scapes of the male and the short epinotal spines and fineness of sculpturing of the worker, however, lead me to believe its affinities are more with *M. brevinodis* Emery. Genitalic slides of the males would quickly settle this point.

Kuznetsov-Ugamskij (1929) gives a map showing the geographical distribution of this species. It is found in large, but isolated, areas between the Caspian Sea and Lake Balkash.

Myrmica bergi var. *barchanica* Ruzsky

M. bergi var. *barchanica*, Ruzsky, Formic. Imp. Rossici, 1905: 678, ♀.

Worker (after Ruzsky): Length 4.5-5.2 mm.

Sides of the head with stronger and thicker reticulations. Almost without upright hairs (there are, however, only isolated upright hairs on the anterior dorsal surface of the thorax, on the petiole and on the base of the gaster); on the head are groups of very thin and short hairs; the antennal scape almost lacks hairs. The wrinkles on the thorax are fewer, more or less regular. Sculpturing of the petiole is weaker. Color lighter than in *bergi*, similar to *stangeana*. Legs lighter than the thorax, yellow reddish-brown. Base of the gaster lighter than the other parts.

Type Locality: Astrakhan: Khauskaja Stavka (early June, 1902) (Ruzsky).

"Living in the midst of a rather luxuriant flora (mainly Linden trees and others). Nests in holes in the ground. I took it also on plants."

Myrmica bergi var. *divergens* Karawajew

M. bergi var. *divergens*, Karawajew, Zool. Anz., 1931, 94: 105, fig. 1, ♀.

Worker (after Karawajew): Length 4.5 mm.

Differs from the typical form as follows: The rugosities from the margins of the frontal area diverge in parallel and straight lines to the (occipital) angles (in the typical form they diverge in a fan-shaped area to the outer corners). The anterior margins of the frontal carinae are clearly rounded (in the typical form—I compare with an example at hand from Tshimkent, Turkmenistan, N. Kuznetsov, 18.VII.23—they

are more pointed). Anterior face of the petiole sloping evenly; in the above mentioned example it forms a weak concavity. In other respects similar to the typical form.

Type Locality: Insel Char-jalach, 50 km. below Olekminsk, 11.6.1925 (L. Bianchi).

This variety was described from one specimen.

***Myrmica bergi* subsp. *persiana*, nomen novum**

M. bergi var. *fortior*, Crawley, Ent. Record, 1920, 32: 163, ♀.

(nec *M. smythiesi* var. *fortior* Forel, Rev. Suisse Zool. 1904, 12: 22-23, ♀.)

Worker (after Crawley): Length 5.0 mm.

"Head broader than in *bergi*, the sculpture of the head and thorax coarser and more broken and that of the nodes much coarser than in the type. Entire body darker than in *bergi*: in all other respects similar to *bergi*.

Type Locality: Iran (N. W. Persia): Enzeli (P. A. Buxton, 1919).

In Dr. Wheeler's collection is what appears to be a cotype with the above locality label. The head is 0.67 as broad between the eyes as long (with mandibles), the mesoepinotal suture is deeper than that of the *bergi* cotype, the sculpturing is coarser and the color is darker. The Kazakstan specimens listed under *bergi* are intermediate between this variety and the typical form.

***Myrmica bergi* subsp. *kamyschiensis* Arnoldi**

M. bergi kamyschiensis Arnoldi, Folia Zool. et Hydrobiol., Riga, 1934, 6: 159, ♀.

A form from Transcaucasia unknown to me.